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# WELCOME

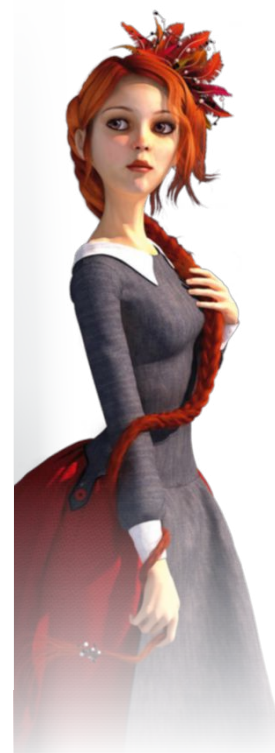
Discover the CG secrets of Zack Snyder's  
\$400 million VFX spectacle



We all need inspiration to keep our creativity on track, and there's no better way than reading this issue's exclusive feature on the VFX and SFX behind Batman v Superman: Dawn of Justice, on page 41. We speak to the veteran team, led by visual effects supervisor John 'DJ' DesJardin to uncover how DC's iconic legends have been brought to life. Now you're inspired, turn to page 57 to take a look at this issue's tutorials, including advice to model a still life scene in Maya, creating a stylised animation in Cinema 4D and destroying a building using RealFlow 2016. All these tutorials come with free video training, work files and more. If you like this issue, then don't miss another – see our new subscription offer on page 40!

**Ian Dean, editor**  
ian.dean@futurenet.com

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ISSUE 207

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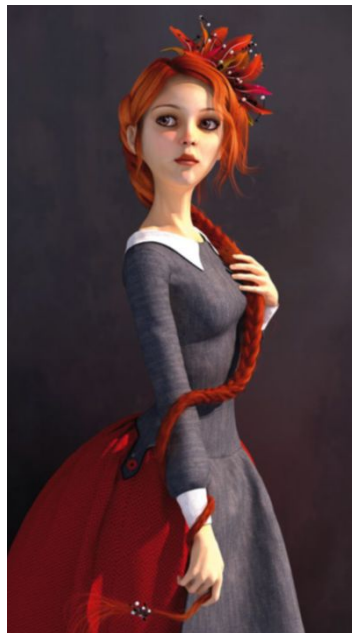
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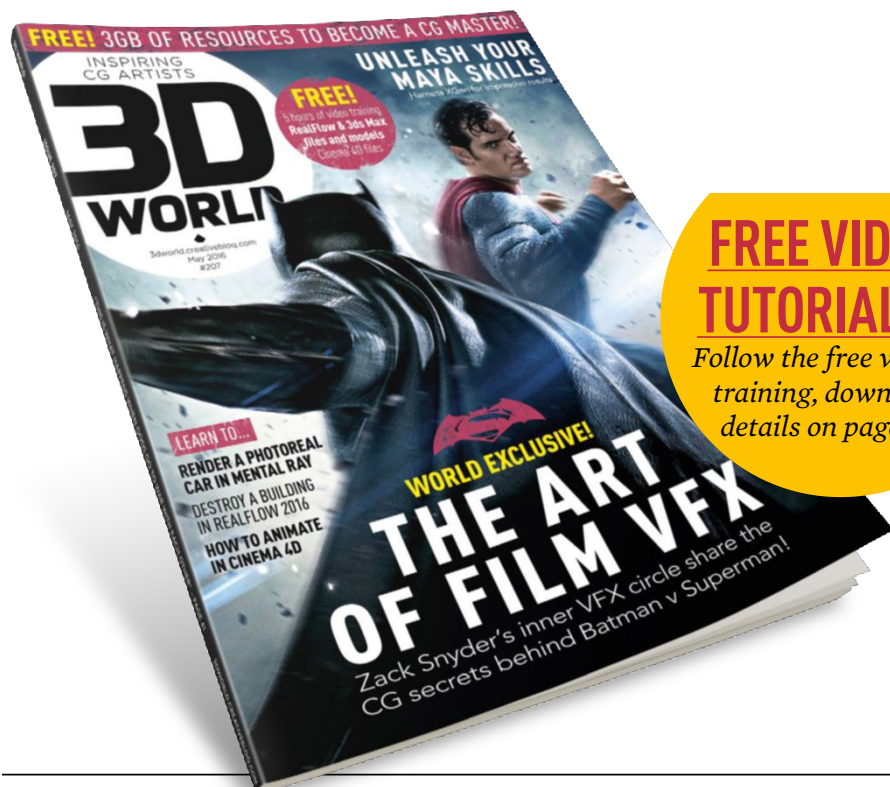
Yoyotech's first workstation impresses, but at what cost?



FEATURED

# ARTISTS

Meet the CG experts and artists who have contributed to this issue



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## ON THE COVER

This issue, the heads of department behind the VFX, SFX and production design on Warner Bros' epic Batman v Superman: Dawn of Justice talk exclusively to 3D World about bringing DC's icons to the big screen.

Turn to page 41 to discover the design choices, CG processes and last minute changes that help make Zack Snyder's vision an explosive reality!

## SPOTLIGHT ON OUR CONTRIBUTORS



### Seth Worley

Seth is a commercial and film director based in Nashville, TN. He's the resident filmmaker at Red Giant, where he produces online content to show off Red Giant's filmmaking tools. On page 24 Seth shares his filmmaking tips and techniques.  
[www.sethworley.com](http://www.sethworley.com)



### Francis-Xavier Martins

Francis-Xavier is a character artist and CG generalist, with over a decade of experience in games, media and TV. Francis-Xavier joins the Artist Q&A team on page 34 to help solve your CG art dilemmas, by translating a 2D concept into a 3D character.  
[www.polyjunky.com](http://www.polyjunky.com)



### Alex York

Alex is founder and director of Atelier York, a London-based architectural and design visualisation studio, with over 10 years' experience in the industry. Turn to page 52 to discover how Coroner Renderer helped Alex in his latest arch-viz project.  
[www.atelieryork.co.uk](http://www.atelieryork.co.uk)



### Bhaumik Patel

Former Escape Studios tutor Bhaumik has created the online training site Amaya Academy. This issue Bhaumik shares his Maya and mental ray techniques as he reveals how to create a dramatic photoreal render of a vehicle at sunset, on page 58.  
[www.amayaacademy.com](http://www.amayaacademy.com)



### Hashem Alshaer

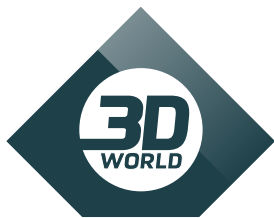
Hashem is a VFX supervisor at 3Q.ae and a partner and instructor at cmivfx. He has more than 14 years' experience working as a VFX/CG supervisor. Turn to page 66 to learn how to simulate the destruction of a building using RealFlow and FumeFX.  
[www.cmivfx.com](http://www.cmivfx.com)



### Josh Parks

Josh is a compositor at MPC as well as a part-time lecturer at the University of Hertfordshire. On page 90 Josh continues his tutorial series for V-Ray for Nuke – this month he focuses on speeding up your workflow with Position pass.  
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**PRINTED IN THE UK BY:** William Gibbons & Sons Ltd  
on behalf of Future.  
**DISTRIBUTED BY:** Seymour Distribution Ltd, 2 East Poultry  
Avenue, London EC1A 9PT, Tel: 0207 429 4000  
**OVERSEAS DISTRIBUTION BY:**  
Seymour International

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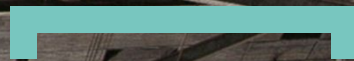




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This project was a big  
and hard step for me



# THE BIRD



## ARTIST

Vitaly Varna

SOFTWARE 3ds Max, V-Ray,  
ZBrush, Mari, Photoshop

Lithuanian artist Vitaly Varna has drawn on the skills he's picked up through his day job to create this clean, atmospheric piece. Besides working for an architectural visualisation studio where he mostly creates interiors, the 19-year-old 3D illustrator has also started branching out into freelancing and personal projects like The Bird. "This project was a big and hard step for me," he says. "I was having fun throughout the whole project but periodically it was a disaster!"

From designing concept work through to publishing, The Bird took five months to complete. "At one point an architect told us that our hangar construction was messed up so that had to be redone," Vitaly explains. Four different directional lights, one for each window in the ceiling, finish off the composition. "The lighting was pretty tricky," adds Vitaly. "We ended up painting light maps to get the shadows we were looking for."

Two months were spent on post production in Photoshop as The Bird required a heavy amount of retouching to polish the finer details. "We also did a photoshoot in a studio for the characters you see in the hangar," says Vitaly. Handled by Pavel Kandibey, the photoshoot compliments the vast amount of research that gives The Bird a realistic appearance.

FYI

See more of Vitaly's work by visiting  
[www.artstation.com/artist/vitalyvarna](http://www.artstation.com/artist/vitalyvarna)



## 3D WORLD VIEW

"Although it was tricky, the time Vitaly invested in the lighting paid off. It has given The Bird a great realistic feel."

IAN DEAN  
Editor



## ORC COMMANDER



### ARTIST

**Sergio Brotons Ripoll**  
SOFTWARE ZBrush, 3ds Max,  
V-Ray, Photoshop

"I'm at the beginning of my career," reveals Spanish-based artist Sergio Brotons Ripoll, a relative newcomer to the industry with no 3D experience outside of his job as a junior 3D artist at Gameloft, Madrid. Based on a 2D painting by his friend and co-worker Jaime Martinez, Sergio's Orc Commander showcases his talent for depicting detail. "The chance to bring images to life and give them a sense of realism motivates me," he says. "That's why I keep my eyes on the experts in 3D and on my co-workers. Their works inspire me to be a better 3D artist."

Completed in just one week, the Orc Commander proved to be a fairly straightforward build. After modelling in ZBrush, Sergio began sculpting in DynaMesh to block out the basic shapes. Bones, muscles and details like the fat and wrinkles were made with ZRemesher. "The creation of the hair was the only tricky step," Sergio explains. "I made it with Ornatrrix for the eyebrows, eyelashes and shoulders."

As well as the modelling, Sergio enjoyed making the shaders the most. "Although there are six lights, only two are actually creating the scene," he says. "The rest of the lights help to create the general mood of the image."

**FW** Keep up to date with Sergio's work at [www.brotons3dworks.wordpress.com](http://www.brotons3dworks.wordpress.com)



To bring images to life and give them  
a sense of realism motivates me

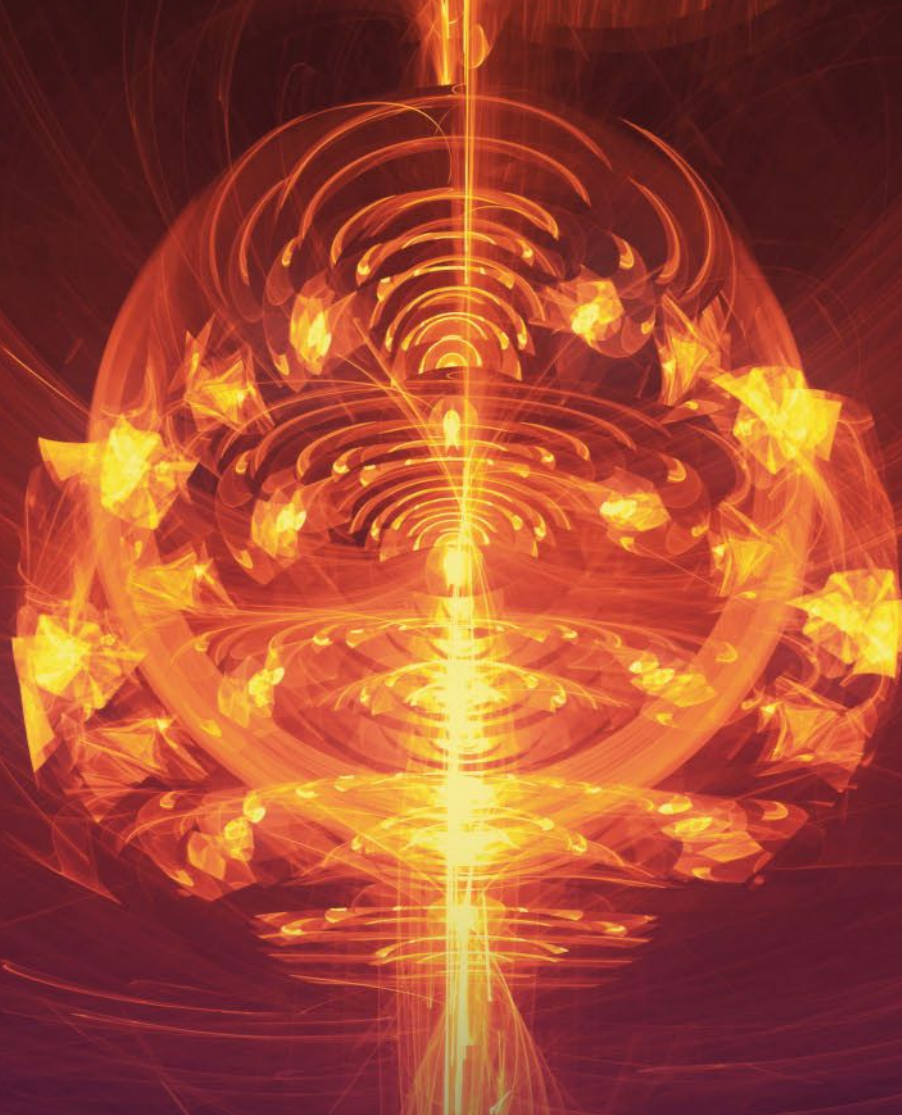


### 3D WORLD VIEW

"Sergio's detailing is very impressive and he's made great use of Ornatrrix, which is brilliant for hair work."

**DARREN PHILLIPS**  
Art editor

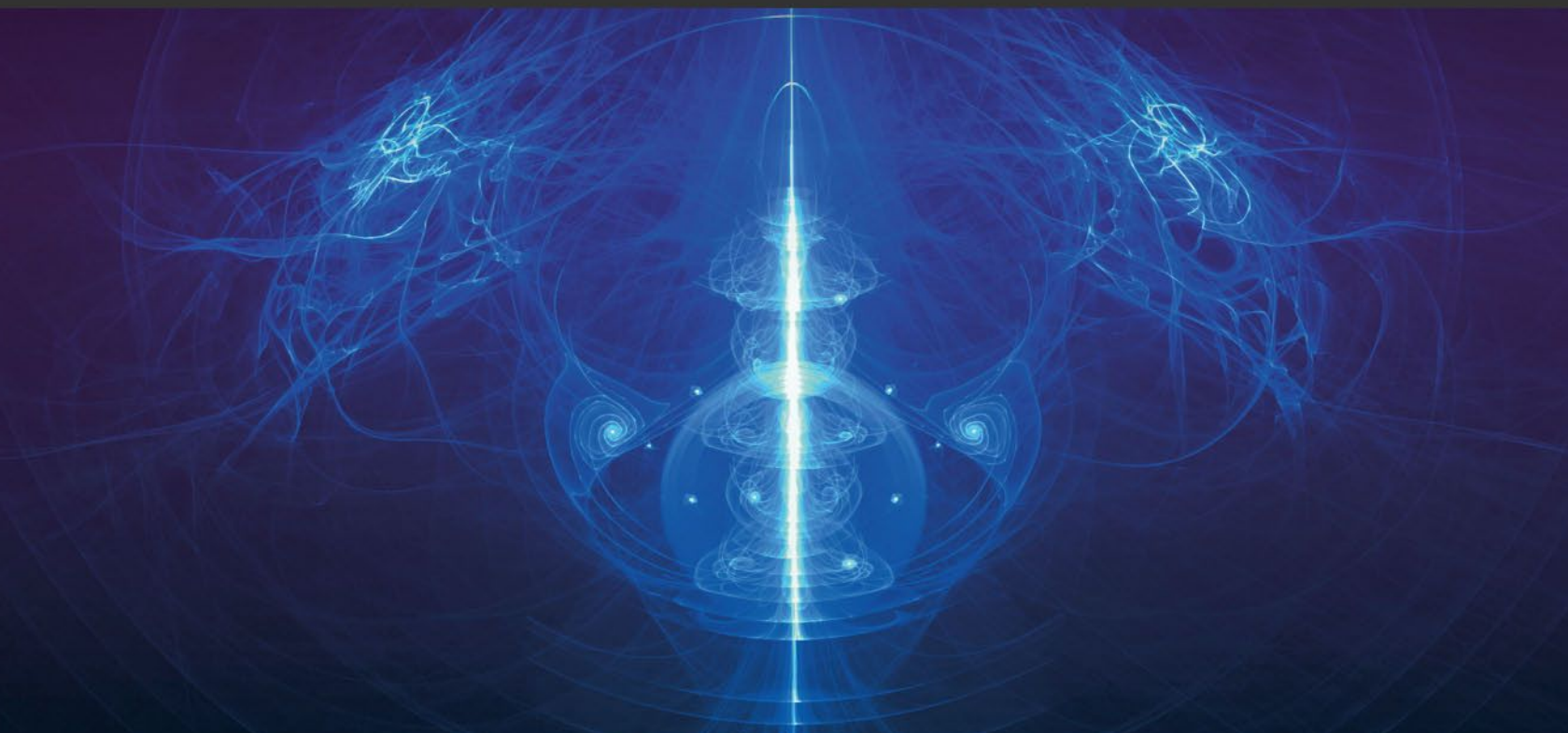




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# MARVEL'S THOR (JANE FOSTER)



**ARTIST**  
Caleb Nefzen  
**SOFTWARE** ZBrush, Maya,  
KeyShot, Photoshop



I enjoyed the freedom I had to  
create her outfit design

Caleb Nefzen, a Colombian artist who works as a digital sculptor for companies including 20th Century Fox, completed this female Thor image in roughly two weeks. "I didn't have time to use fancy tools on this project," he says. "But for this sort of job I think people value more your work being made as close to traditional sculpting as possible."

Finding fun in creative challenges, Caleb tasked himself with making a sculpt that would attract people to a new and divisive Marvel character. Basing this sculpt on the female version of Thor, which debuted in 2015 gave Caleb an element of creative leeway. "I enjoyed the freedom I had to create her outfit design, while somehow keeping the essence of the original," he explains.

Using the Clay Buildup brush, Caleb started sketching the basic form of the character in ZBrush. "I try to keep my hand and mind as free as I can, so everything flows better," he says. From here he defined the shapes using the Dam\_Standard brush. Working from the head down, Caleb used inserts, masks and move brushes to get the anatomy as close to life as possible before creating a clean topology. "If the topology is not good enough, it's hard to make good details on the sculpt," he says. "Once I'm happy with all the basic shapes, I make details and pose the figure."

**FYI** To see more of Caleb's portfolio, visit  
[www.artstation.com/artist/calebnefzen](http://www.artstation.com/artist/calebnefzen)



## 3D WORLD VIEW

"Caleb's Jane Foster proves you don't need fancy tools to create great work. Her outfit is particularly impressive."

**FELICITY BARR**  
Production editor



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## HIGHWAY PATROL



## ARTIST

Col Price

SOFTWARE 3ds Max,  
mental ray, Photoshop

Concept artist Col Price has turned his childhood diet of 70's and 80's sci-fi movies into a career, with his Highway Patrol artwork showcasing his references. "Chris Foss and Jim Burns have a lot to answer for," he says. "Movies are a great source of inspiration. I love the Marvel universe and anything by Ridley Scott. Blade Runner has been a huge influence on my career."

Having worked in the games industry for 20 years as an art director for companies including Sony, EA and Evolution Studios, Col took the plunge and became a freelancer a few years ago. "I still work on games but now I have the added fun of working in film and TV so my work can vary hugely," he explains.

Highway Patrol was completed in just a few hours as Col likes to finish an image almost every day. "I think it's important to have that discipline of speed under your belt," he says. Choosing to render multiple angles of the ship also gave Col the freedom to pick the best foundation to work around. "I try to keep away from plug-ins. I prefer just to freeform model, if I need to add anything else I just paint it up in Photoshop."

FYI

Browse more of Col's amazing work at  
[www.coldesign.co.uk](http://www.coldesign.co.uk)



## 3D WORLD VIEW

"Col's influences come through clearly and I'm impressed by how quickly he's achieved this result. Great work!"

IAN DEAN  
Editor



It's important to have that discipline  
of speed under your belt



# REPTILE QUEEN



**ARTIST** Alexey Kashpersky  
**SOFTWARE** ZBrush, V-Ray,  
3ds Max, Photoshop,  
After Effects

Outside of his job creating 3D art in the fields of medicine and microbiology for Radius Digital Science, Ukrainian illustrator Alexey Kashpersky also produces stunning fantasy artwork such as his vibrant and intricate Reptile Queen. Started way back in 2011, this piece took Alexey four-and-a-half years to complete, with the last few months seeing him working flat out in order to meet the 'Tribute to Boris Vallejo and Julie Bell' contest deadline.

To get a realistic reptilian look, Alexey started his research by buying a real iguana. Thanks to his unique pet, Tamerian, Alexey was able to capture amazing living references. "Nature is perfect in its shapes and beauty. It's the perfect inspiration," he says. However this didn't stop Alexey having difficulty creating the creature's tail. "In nature its cross-section is shaped like a distorted number eight and it has dense, small scale details all the way along," he explains. "In the end I built a small cross section element and let him go on the guide spline."

At the same time Alexey positioned the female figure, with its skin tearing like a reptile's. "It was an interesting process to try and catch that African-American looking woman," he says. "In my mind this represents mother nature and the basis of life in the best way."

**FYI** To follow Alexey's work, visit [www.kashpersky.com](http://www.kashpersky.com)



## 3D WORLD VIEW

"Alexey was certainly committed to this project and the living references have clearly been a great help."

**DARREN PHILLIPS**  
Art editor



Nature is perfect in its  
shapes and beauty



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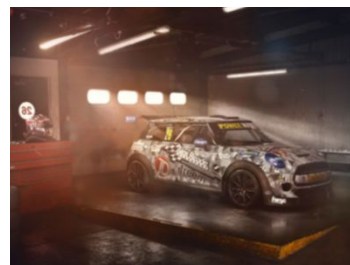
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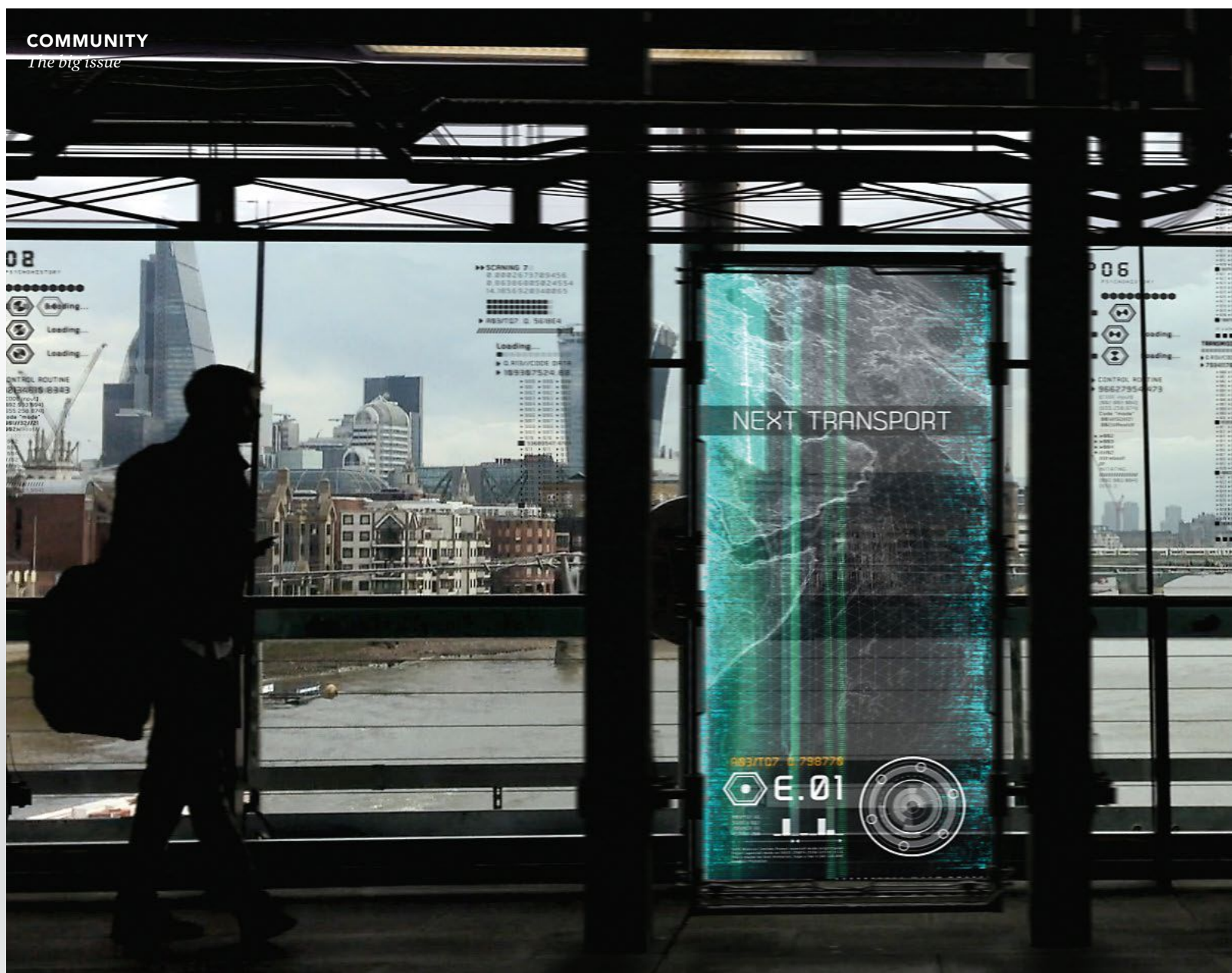
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## THE BIG ISSUE

# SHOULD YOU TAILOR YOUR CAREER TO FIT WITH VFX?

With VFX constantly evolving, there's no such thing as a straightforward career path, discovers **Dom Carter**

Hosted in London's landmark O2 Arena, the recent VFX Festival 2016 was an invaluable chance for students and qualified VFX artists to gain a deeper understanding of the industry, hear about the latest creative developments, meet studios in person, and if they're lucky, land a job. With the industry covering a broad range of ever-changing skills and tools, it seems the career of a VFX artist can branch out in surprising directions. But how can you get started?



"Stay in school, finish everything, and you'll have an overall impression of the industry," advises

independent director and motion designer JM Blay. "Later on you can specialise and finish your studies." JM also combines his design career with an educational profile. "It's not related at all," he laughs, when talking about whether his PhD has helped him progress his motion graphics career, although it has helped with the

Director and motion designer JM Blay, whose work can be seen here and above, advises students to finish school and specialise later on

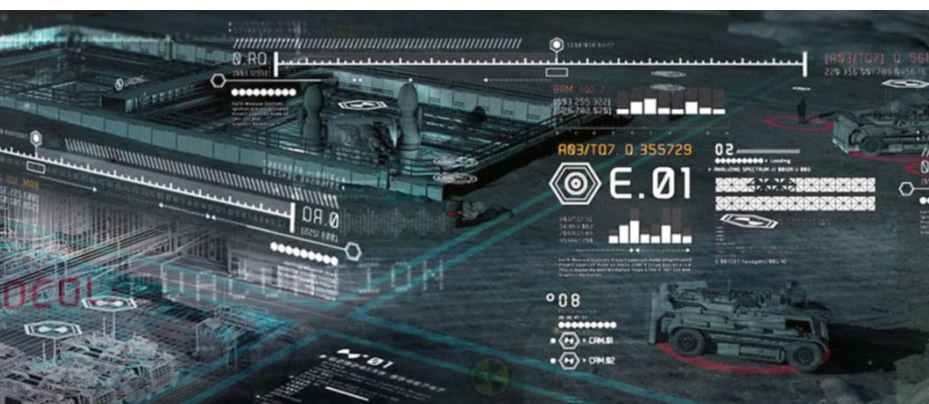


"constant, constant remembering of all the skills you need to learn."

"Motion graphics is an intermediate profession; you can have it in movies, animations, games, even in education," he adds. "Every industry needs a motion graphics designer. It can't be put inside a box. You can have super different profiles inside the same field. You can do anything."

However, having worked as a motion designer with different studios for over 20 years, JM has seen how





the prominence of digital artists has overtaken higher education. "The change has been really recent. And universities are always behind the industry, they always try to mimic what the industry is doing at that time."

With the explosive growth of interest in VFX and CG animation outstripping university places, it's no surprise that people are getting into the industry from different angles and bringing unique skills to the table.



"I think it's usually that people want to get into games, but they don't know exactly what they want to do in games," explains Sharan Bassi from video games recruitment agency Aardvark Swift. "We get a lot of people that like art but don't know where to take it. In terms of environment art or character art or props or vehicles, there's lots of strands that you can go off on to. You can definitely get into the games industry accidentally."



## INDUSTRY INSIDERS

*Thoughts & opinions from the experts*



**SHARAN BASSI**  
Recruitment  
consultant,  
Aardvark Swift  
[www.aswift.com](http://www.aswift.com)

"Some courses are designed to build a student's capabilities and skills, and it's only in their last project that they'll specialise in one area, so they'll be good at environment, good at characters and vehicles. If you want to make it as easy as possible to get into a studio, keep brushing up those skills. Don't let any skills drop down. However, you've always got to go beyond your degree. Networking and getting your name out there is really important."



**JM BLAY**  
Head of motion  
graphics at Escape  
Studios  
[www.pearsoncollege.london.ac.uk](http://www.pearsoncollege.london.ac.uk)

"Keep working, keep working, keep working. Create something, put it together in a showreel, then start calling people. We're in a creative industry, so what that means is, be creative. As a regular guy, my advice is for regular guys, so if you're amazingly talented and you're going to be the next big name in the industry you're going to make it work and you're not going to need to go to university, but that happens one in a million. For the rest of us mortal ones, you have to work. Professionals have knowledge about the world and the different skills, and that's something that university can provide you with. It's like an honorary profession."



**HASRAF DULULL**  
Filmmaker  
[www.hazfilm.com](http://www.hazfilm.com)

"A lot of my career was to do with timing, but also because I was very hands on. I didn't rely on other people. If I wanted something done, I'd get it done. Anyone can make movies, and it's the ones that get there first who make it, and I got there quicker because of my skill set."





Going to film school isn't necessarily the only way to get into the industry



But similarly once you're in the industry you don't know quite where you're going to go."

A convergence of tools has only added to this lack of a rigid career path. "There are loads of overlaps, but with new technologies like VR and

If you have a passion for telling a story... if you can focus on that, then you're going to score big time

*Scott Pritchard, sequence supervisor, ILM*

mobile industry increasing there are definitely going to be newer skills that companies are looking for, which will lead to new roles, especially with VR where artists need to be able to use Unity and learn new skills."

Formal education isn't for everyone though, and director Hasraf Dulull explains that you can get far by teaching yourself and working hard.



"I didn't go to film school, I didn't take the traditional route of what a lot of film directors do," he says. "I used to work in video games, so everything I've learnt about filmmaking

has been through visual effects. And it was through being a VFX supervisor that I realised that I wanted to make movies," Hasraf enthuses.

For Hasraf the big learning curve was realising you don't need to rely on other people to achieve your ambitions. Learning on the job and adapting to challenges, and hard work, pays off in the end.

One person who can relate to this self-made attitude is ILM's sequence supervisor Scott Pritchard.



"For those that want to take their first steps into the industry, be persistent," he says. "I had a bunch of rejection letters from all these different companies because my showreel wasn't good enough. I was halfway through university at the time," he continues, with advice that applies to any creative ambition. "It took a lot of knocking on doors because there's a lot of competition in the industry. But I think be passionate, be curious, and I think if you can have a passion for telling a story – because ultimately that's all we're doing – if you can focus on that, then you're going to score big time."

FYI

To sign up for The VFX Festival 2017 go to [www.thevxfestival.com](http://www.thevxfestival.com)

DO IT  
YOURSELF

Short filmmaker Hasraf Dulull explains it's easier than you think to start making VFX shorts

Being a freelancer, you earn a certain amount of day rate, then you put a little aside in your piggy bank for filmmaking. And over the month I accumulated a certain amount of funds for sound, audio, crew, paid for the expense of actors and stuff like that, and saved a lot by editing myself. But still, you're taking a risk. It's a blessing though, because you're much, much more careful about how you're spending your pennies.

Sponsorships I've gone for haven't been cash financing, because I funded it myself, and a lot of that's to do with letting me retain more control as well. I got to use Adobe Premiere as long as I talked about it, which was a win-win for me, because I got to talk about Adobe, and I got to talk about the film. For my last film I got Black Magic involved, and they were impressed that I filmed very fast and they wanted to support independent filmmakers. Having cameras provided for you saves a lot of money! But most importantly it attracts people to your projects.

If I got a new piece of software, I wouldn't read a manual and go, oh this is how you do it, I'd just go in and do it. But to me I find it more fun when you're learning to use a piece of technology or a new tool on the job because all the problems you come across, and the things that you want done, are specific to you – it saves you reading a 200 page software manual.

Being in visual effects for 15 years, we're so used to dealing with resolution, but now with VR it's not about resolution anymore. We're dealing with a whole different way of working. When you shoot a movie you film your shots, you compose your shots, you film your shots, then you edit. There is no editing in virtual reality! Even though we're using existing tools and existing artistic skill sets, the way we go about it has evolved. We're now thinking about 360, we're thinking about the environment, which comes with its own nightmares, but also it opens up great opportunities and new ways of telling stories.

The lines are blurring between films and video game special effects. We're going to get to a point very soon where we're capturing stuff in real time and it stands side by side and it's just as good. It's very exciting. I can imagine a world where a director puts on a headset and they're just set designing, moving stuff around, cuing an actor, and watching the scene. It'll get to the point where filmmakers are immersed in the environment.



IMAGE COURTESY OF EVGENY RUSOLOVSKI



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## INDUSTRY INTERVIEW

# THE ROOKIES: CALL FOR ENTRIES

The Oscars for creative students has launched – have you entered yet?

The hosts of the CG Student Awards have launched a new international awards scheme, covering more categories than ever before. Dubbed the 'Oscars for creative students', The Rookies is a platform for talented students to launch their careers, network with the creative industry's top studios and connect with

We want to create a clear path for all students to get some feedback and become comfortable with showcasing their work

*Alwyn Hunt, co-founder, The Rookies*

The 2016 awards will cover 12 categories in which students can showcase their talent

the next generation of creative minds. In its new format, the scheme builds on its heritage of VFX, animation and next-gen gaming to add a further nine prize divisions that focus on the most

### ALWYN HUNT

Alwyn is the co-founder of The Rookies and Tyroe.com, a recruitment platform for digital artists. [www.therookies.co](http://www.therookies.co)



competitive artistic industries – from illustration to virtual reality. The goal of the The Rookies, explains co-founder Alwyn Hunt, is to create a bridge that joins schools with studios. "We want to create a clear path for all students to get some feedback and become comfortable with showcasing their work to the world," he says.

### Getting your work noticed

If you're a graduating student, one of the main reasons to start preparing your entry is to get your work directly in front of the judges. "There are some big names in there, and you never know what opportunities could arise from being in the right place at the right time," says Alwyn.

"The point is to get yourself out there, show your work at all levels of completion, and start a dialogue with both people in the industry. Oh, and there is a massive bounty of prizes and paid studio internships up for grabs," he adds.

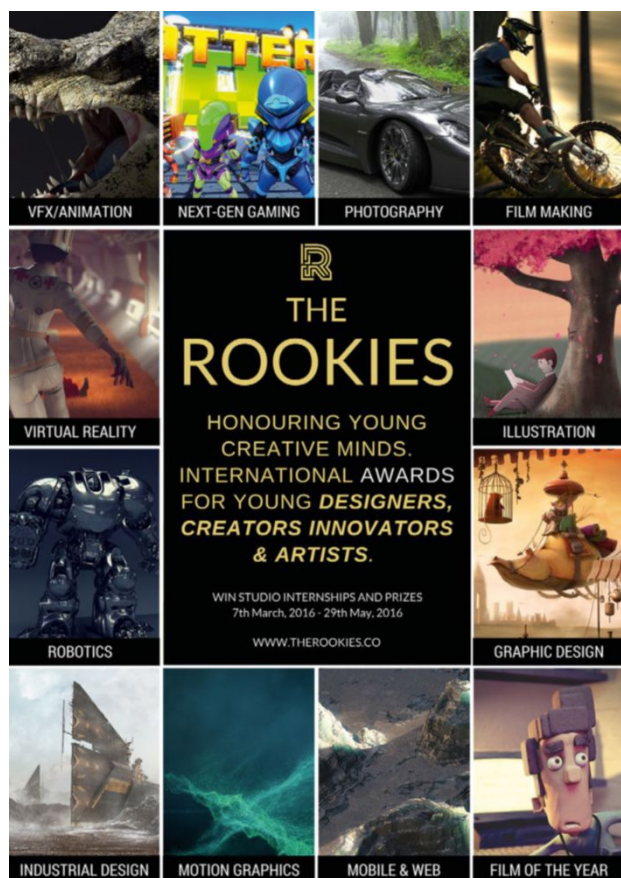
So, what's the key to getting yourself noticed by the judges?

### JUSTIN MOHLMAN

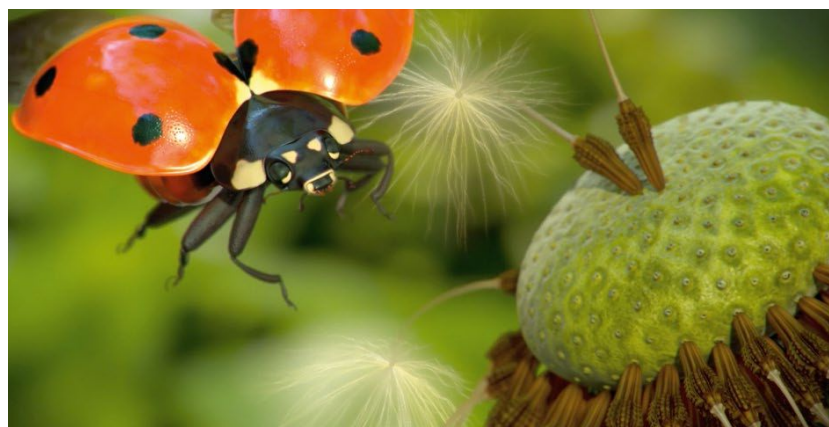
Justin is a game artist and educator with over 10 years' experience. [justinmohlman.com](http://justinmohlman.com)



"I'm looking for quality over quantity, and a focus on the discipline they're aiming to work in – but also just pride and care," says Rookies judge and game artist Justin Mohlman. "I want to see someone who takes the time to flex their creative and technical muscles on focused projects, and displays them



Szabolcs Menyhei and Esther Lopez, whose work can be seen here (and below) were both award winners





Danny Mak advises students to enter and admits companies reached out to him after he won an award



THE  
ROOKIES

TO ENTER GO TO:  
[WWW.THEROOKIES.CO](http://WWW.THEROOKIES.CO)



in a cohesive way with basic design principles in play. Things like composition, colour theory and scale are often overlooked, as well as adding character to an asset or scene."

"I want to look at a submission asset, whether it's a big hulking monster, sci-fi robot or a simple chair, and know where it's been and the purpose it served. The little details of a simple scratch or wear in a material are big wins in my opinion," Justin enthuses.

Winners will be propelled into the industry, strewn all over the internet and get a red carpet introduction into their career of choice. "Aside from the prizes and internships, the bottom line is that the winners get some serious recognition at an industry level," Alwyn points out. "They instantly get some street credibility and take a few massive steps up the career ladder."

#### SHEREE CHUANG

Sheree is an emerging digital artist specialising in 3D modelling, texturing and lighting. [shereechuang.com](http://shereechuang.com)



"It opened so many doors for me," says past winner Sheree Chuang. "I was invited by Rising Sun

Pictures to take their in-house compositing course and they hired me as a junior lighter for the feature film, Gods of Egypt."

Garrick Rawlingson, who also won an internship – which turned into a job – agrees. "I went from living in London to New Zealand, from an advertising company to one of the VFX world leaders. I'm lucky enough to learn from the best every day."

#### GARRICK RAWLINGSON

Garrick is a junior animator for Weta Digital. His credits include The Hobbit [zerply.com/garrick](http://zerply.com/garrick)



#### More opportunities

The full 12 categories for The Rookies are: Architecture & Visualisation, Fashion Design, Game Design & Development, Graphic Design, Illustration & Concept Art, Industrial

Design, Interior Design, Photography, Virtual Reality, Visual Effects & Animation, and Web & Application Design. Importantly, there isn't an entry fee – so there are no barriers to submitting work.

Since 2009, when the CG Student Awards began, the scheme has given away over \$900,000 USD in prizes and 74 paid internships. That's set to rise with the launch of The Rookies.

"We're expanding our reach because there are so many talented students out there studying all sorts of amazing creative and technical skills," says Alwyn. "We wanted to make sure they got some exposure too. People can submit illustration and concept art, all the way up to virtual reality and even robotics." The Rookies is open now, deadline for entries is 29th May 2016.

**FY** For more information head to the website: [www.therookies.co](http://www.therookies.co)



## COMMUNITY

Industry project

Red Giant's short *Go Bag* posed challenges for Seth, such as creating an on-screen explosion which he describes as insanely hard to do



## INDUSTRY PROJECT

# INSIDE RED GIANT'S BAG OF TRICKS

*Seth Worley* reveals how Red Giant shot their action-packed short film, *Go Bag*



A luggage mix up leads to an unwitting spy facing the toughest day of her life in *Go Bag*, the latest project from Red Giant. Matching tight direction with ingenious in-house visual effects, this short cleverly balances humour and action while constantly escalating the drama.

### SETH WORLEY

Seth is a commercial and film director based in Nashville, TN. He's the resident filmmaker at Red Giant, where he produces online content to show off Red Giant's filmmaking tools. [www.sethworley.com](http://www.sethworley.com)



"One day my Dad jokingly texted me an idea for a TV show he'd thought up, in which Jack Bauer and Constable Bob engage in an in-depth conversation about their 'go bags'," explains Seth Worley, who both wrote and directed the studio's eighth film. "But after reading it I realised I had never seen a movie or show actually titled 'Go Bag,' which was kind of absurd to me," he adds. This led to the idea of a spy escaping danger using normal items like a laptop, socks and a shaving kit.

With the threats including fireballs and gun-mounted helicopters, Seth quickly ran into a few obstacles. "Before *Go Bag*, I'd never been able to properly execute an on-screen explosion," he says. "Explosion and fire comps are insanely hard to do right and insanely easy to do wrong," he explains.

Fortunately Seth had just finished directing *Real Gone* with Ryan Connolly for Film Riot, which involved a lot of digital pyrotechnics. "I learned a lot through trial and error on that, which gave me a huge head start in approaching the big explosion at the end of *Go Bag*," he says. "It ended up being made up of stock explosions from several different sources, blending them with the helicopter using a world position pass in Element 3D."

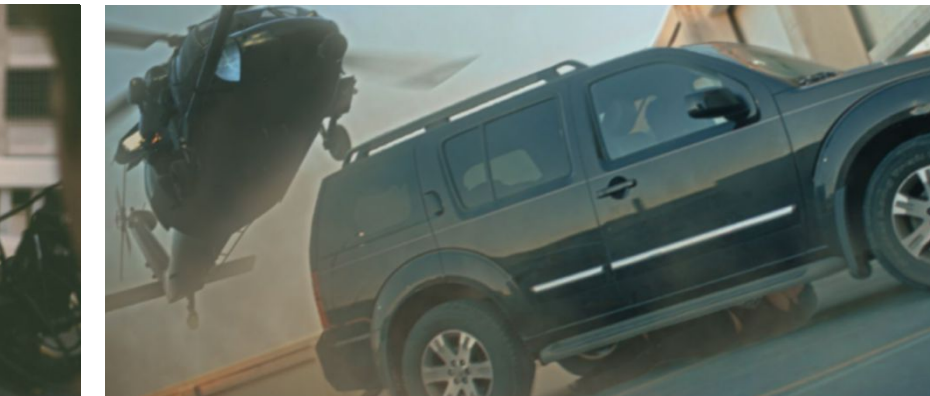
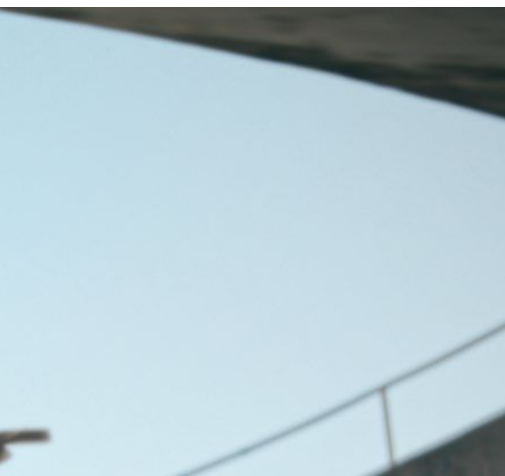
Shot entirely in a parking garage in Downtown Nashville, *Go Bag* also involved a lot of car stunts that required careful planning. With the help of

motion graphics designer Harry Frank, the line between performance and effects became seamless. "On this one, he used Mocha to erase the safety rigs from every shot of Rabbit (the protagonist) on the hood of the car," adds Seth.

One shot in particular, where Rabbit has to turn and jump onto a car, involved special attention. "We shot her turning and jumping onto a crash pad, then repeated the shot but removed the actress and had the SUV drive through frame," Seth reveals. "I was able to merge the shots in After Effects using Roto Brush and the Puppet tool to create what I believe is one of the coolest moments in the film."

When asked if there was one effect he was particularly proud of in *Go Bag*, Seth singles out the sequence where Rabbit appears to lie underneath an SUV and manually push it down a





Go Bag was shot entirely in a parking garage in Downtown Nashville, with the many car stunts requiring particularly careful planning

ramp. "We shot the car and the actress separately, putting the actress on a small crashpad tied to a rope that [stunt coordinator] Jeff Ailshie used to drag her across the parking lot," Seth explains. "She looked and felt utterly ridiculous, but she was a total pro and committed 200 per cent to the performance. In post, I was able to roto and composite her under the car, and I still get a kick out of how awesome it looks."

## Plug in and play

Red Giant also develop motion graphics software plug-ins, which Seth used to help create Go Bag. "I used [organic 3D particle effects generator] Trapcode Particular throughout the film, especially in the helicopter sequence to add the embers and sparks that are coming off the torch in the gas tank."

Territory Studio used the company's Trapcode Suite when working on Go

Bag's end titles. "They imported .objs into Trapcode Form to create the wireframe/point cloud models that scroll through the sequence, and by using Form they were able to animate the entire thing within After Effects,"

I used Trapcode Particular throughout the film, especially in the helicopter sequence to add the embers and sparks

Seth reveals. "They also used Trapcode Tao rather inventively to create transitional elements."

It's this unique combination of plug-ins and films that keep Seth creatively satisfied. "Honestly this job wouldn't be half as fulfilling if I only set out to do things I knew how to do."

**FYI** Explore Red Giant's films and software by visiting [www.redgiant.com](http://www.redgiant.com)

Seth believes you need to have fun when working on a project and always factor in enough time to allow everyone to produce their best work

## IMPROVE YOUR ACTION SCENES

Shoot better combat scenes by following Seth Worley's invaluable tips

### 1. BE CONSISTENT

Treat your VFX plates like every other shot. If your scene is handheld, shoot the plates handheld. Resist the urge to lock it down or shoot safe. The audience will notice, no matter what you do in post.

### 2. SCHEDULE FOR SUCCESS

Schedule your most complex and exciting shot at the beginning of the day. Then when you're scrambling at the end of the day, you're rushing the easy stuff.

### 3. TAKE RISKS

Make sure you're not just shooting 'sixes' and 'sevens' (shots that do the job and nothing more). A good action scene deserves a fair amount of 'kings' and 'queens' (shots that dazzle and impress).

### 4. LOVE THE GENRE

Study your favourite action scenes. Pay attention to the coverage, not the edit. Where were the cameras? Theoretically, how many cameras could have been rolling at once? Based on the final scene, write up what you think the shot list was that day. Don't work too hard to retain this information, the right stuff – the instinctual stuff – will stick.

### 5. BE REALISTIC

Schedule extra time. Action, stunts, fights, car chases – this is the stuff everyone on your crew got into this business to do, and chances are they don't get to do it very often. Schedule enough time for everyone to have fun and bring their best work and it'll show on screen.





INDUSTRY INTERVIEW

# CREATING VR WITH BITE

*Ben Kidd* tells *Ian Dean* why VR will be the leading tech of 2016, and why artists need to jump in...

**W**e keep being told that 2016 is the year virtual reality will take off. The team at Hamilton+Kidd believe it can only be good, and have set up Curiscope to make the most of the clamour for the technology.

Great White Shark is the first foray into VR for the company and aims to make education fun, as viewers are immersed in the ocean alongside the infamous sharks. Having experienced the animation on a Samsung VR headset, it achieves all of its goals. The 90-second film gets you close to the great whites, while audio explains their behaviour and cutaways reveal the working organs of the animals.

## BEN KIDD

Ben is co-founder of Hamilton+Kidd and Curiscope, who are building educational adventures in virtual and augmented reality, designed for ages seven years and up.

[www.bit.ly/ben-kidd](http://www.bit.ly/ben-kidd)



"If you dive with sharks your heart is going to be thumping away in your chest anyway," explains Ben Kidd, co-founder of Curiscope. "In the film we wanted to get that feeling, and I think we've succeeded."

The VR animation is the amalgam of Hamilton+Kidd's experiences of creating video game and real-time animations, and makes use of V-Ray and Unity to bring the sharks to life. "V-Ray has the right lens shader for VR," says Ben, saying it creates "volume you can reach out and touch."

Due to the technology used, Ben is confident that most 3D artists will be able to adapt to creating VR movies and

animations. The software and pipelines you use now in game development and animation can be refined and applied to a VR workflow.

There are teething problems, Ben explains: "Depth of focus becomes tricky in VR. The tricks you use in film to add depth to your scene just don't cut it in a VR movie because your eye sees what's actually there, not what you want to trick it into believing is there."

**V-Ray has the right lens  
shader for VR... volume you  
can reach out and touch**

While Great White Shark is the first VR film from Curiscope, it won't be the last. Ben explains the team ultimately want to create an encyclopedia of VR movies on all subjects. But is this possible, will VR really take off? "Mobile has made VR incredibly accessible, with Google Cardboard and 360 video on mobile, VR is already here... the VR market is the App Store. VR is about way more than gaming."

Ben sees VR as a way to regain viewers attention. A tweet may hold your attention for seconds, a VR movie has you hooked in its world, "I see VR as a way of undoing all of the damage done by social media," he concludes.

**FYI** Watch the Great White movie here:  
[www.vrvideo.com/watch/ytZm6Sa](http://www.vrvideo.com/watch/ytZm6Sa)

## AXIS EXPANDS

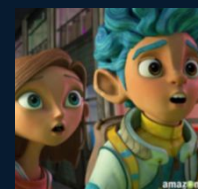
Two new projects  
revealed for 2016

### AXIS ON TV

Kiss Me First, a new six-part thriller created for E4 and Netflix is in production at Axis and marks the studio's expansion into TV from video game cinematics. "People's perception of animation is changing, animated content is not just for kids and Kiss Me First is a natural extension to the Axis teams' work on some of the world's biggest game franchises," says managing director of Axis, Richard Scott.

### FLAUNT IT

Axis' sister studio Flaunt also announced the creation of its long-format division and will focus on TV animation, TV specials and feature films. Flaunt has already begun to expand, hiring new staff in its UK studios located in Bristol and Glasgow.



### FEELING POSITIVE

"We are incredibly excited about both the creative and business opportunities in the long format market, and believe the group's reputation for collaborative relationships and high production values mean that this is just the start," explains Richard.

Great White Shark offers viewers an unrivalled encounter with the ocean's greatest predator, including its internal organs





The most challenging scene to create was where the coastguard boat encounters 30-50 foot waves

## INDUSTRY INTERVIEW

# EYE OF THE STORM

**Seth Maury** reveals how his team at MPC plunged us into the depths of one of the most perilous sea rescues of US history in Disney's *The Finest Hours*

**T**he *Finest Hours* captures one of the most turbulent storms to hit the USA's East Coast, and the story of the coastguards who set out to rescue an oil tanker that's been broken in half due to the violent sea conditions. Set with the challenging task of realistically reproducing the tempest that rocked the New England coast back in 1952, was visual effects studio, MPC.

### SETH MAURY

Seth joined MPC Vancouver in 2011 as VFX supervisor for *Sherlock Holmes: A Game of Shadows* and led the team for Disney's *Maleficent*. Seth is currently working as VFX supervisor on *Suicide Squad*.  
[www.bit.ly/Seth-Maury](http://www.bit.ly/Seth-Maury)



"The pipeline on TFH was a little different from the traditional VFX flow," admits VFX supervisor, Seth Maury.

The team learned a lot about water simulation from their previous work on *Life of Pi*. "The process started with the FX simulation department." The FX team made a base library of realistically simulated oceans for animation and layout to use further down the line. "The idea was if you already had a properly physically simulated ocean, then the fluid solvers could generate all the secondary

passes of smaller waves, mist, foam, and so forth," adds Seth. "Once these base oceans were created, animation and layout would then do digital scouts on them to find waves and locations that best suited the action needed."

### Pushing the boat out

As production progressed, however, sometimes the team found these base oceans didn't always have the right types of waves, so they needed to create more waves with physical properties that the story demanded, resulting in 15 different base oceans to choose from. The team used blue screen plates of the practical boat and actors in a water tank that could be match moved, roto animated and placed in their oceans.

Using a combination of Maya, FlowLine, V-Ray, Houdini and PRMan, the team were faced with a fair few challenges. "We didn't have a lot of the standard elements to put in frame to

help with scale, like humans, or birds, or landmarks. Many shots were just open ocean and a ship, and sometimes when you film from an uncommon angle with no common reference points, the shot can look miniature, so many shots were a study in how to adjust, add, or build so that they didn't feel miniature."

I feel we created something that hadn't yet been seen on screen... and that's always a great opportunity to have

### Riding the tide

The most challenging scene, reveals Seth, was the sequence where the CG36500 coastguard boat has to cross the Chatham Bar in 30-50 foot waves in various states of swelling and spilling. MPC had to develop new systems to create each of these waves and layer them into the same scene. "Many shots in this sequence were crafted as single-solution waves, such as looking down the barrel of a crashing wave, or being pushed along and backwards by a wave that had already crashed."

But this all paid off, Seth admits, "I feel we created something that hadn't yet been seen on screen – in both style and volume of shots – and that's always a great opportunity to have in visual effects."

**FYI** To watch *The Finest Hours* trailer go to [www.bit.ly/finest-hours](http://www.bit.ly/finest-hours)



MPC's knowledge of water simulation from their work on *Life of Pi* proved useful when working on *The Finest Hours*





## STUDIO PROFILE

# SQUEEZING THE MOST OUT OF CHARACTERS

*Jim McCauley* talks artistic creativity with Québec City's little Pixar, Squeeze Studio

### DENIS DORÉ

Denis is president and co-founder of Squeeze. Formerly a university scholar and video game producer, he is a true innovator inspired by new and creative projects. [squeezestudio.com](http://squeezestudio.com)



Founded upon a vision of creating a little Pixar in Québec City, Canada, Squeeze is a studio that knows its limits and uses them to its advantage.

"Our vision was simple," says co-founder and producer, Denis Doré. "We wanted to benefit from Québec City's talent to create a studio specialised in 3D character animation. We knew that we couldn't excel in everything, but if we chose a niche, we could compete with the best studios in the world."

Denis had his work cut out from the start. "Patrick and I launched Squeeze with only one business deal signed," he explains. "We then had four months to find another project to be able to pay the five employees that we had just hired!"

The gamble paid off, though, and Squeeze has moved up from producing video game trailers and TV ads to creating its own animated series, Cracké, which Denis cooked up alongside co-founder Patrick Beaulieu. "We gave life to the main character and developed his paranoid personality," says Denis. "Patrick created the visual identity; I put words on his images."

"My role was to create a special world, with a film look but on TV, with an old school animation style that would be unique to Squeeze," continues Patrick. As Cracké's creative director, he then had to share this vision with the team. "The experience was wonderful, full of creative freedom, with a team bursting with ideas!"

The artistic creativity demonstrated in Cracké is key to Squeeze's ethos. "In an era where there are many studios and plenty of artists out there, where technology is

### STUDIO STATISTICS

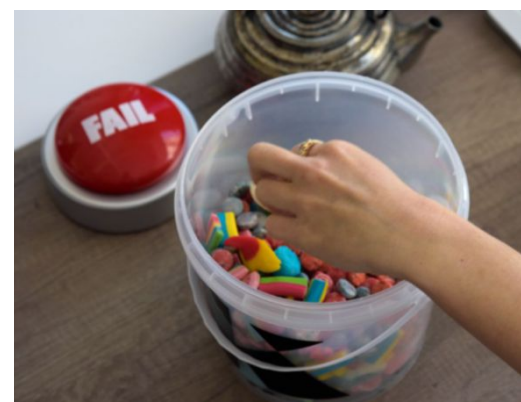
**LOCATION**  
Québec City, Canada

**TEAM SIZE**  
50

**KNOWN FOR**  
Creating and giving life to epic characters

### DIRECTOR'S NAME

Co-founders:  
Denis Doré and  
Patrick Beaulieu



available to everyone, creativity is the foundation of all our projects," Patrick tells us. "Everyone at Squeeze can be creative and bring ideas. Squeeze is an artist studio supported by production and technology."

Creativity is the foundation of all our projects... Everyone at Squeeze can be creative and bring ideas

*Patrick Beaulieu, creative director and co-founder, Squeeze*

It's this creative focus that makes Squeeze a great place to work for artists and animators, as animation director Daniel Huertas explains.

"I wanted to work in an environment 100 per cent driven by the quality of animation and with no performance limits. The 'wow' moment would be the day I worked from 8am until 5pm without even realising it, because I was enjoying my job so much – and I still like it as much now!" Daniel worked mostly as a 3D character

### PATRICK BEAULIEU

Patrick is creative director and co-founder of Squeeze. His creations have been published across the world in more than 60 3D magazines. [squeezestudio.com](http://squeezestudio.com)



### DANIEL HUERTAS

Daniel joined Squeeze in its beginnings after a few years in the video game industry. As an animation director, he helped develop Squeeze's unique animation styles. [squeezestudio.com](http://squeezestudio.com)







In just four years Squeeze has gone from five employees to 50, and has its own series, Cracké, on the way



## OFFICE BRIEFING

Squeeze Studio Animation was founded in 2011 by Denis Doré and Patrick Beaulieu, who are both veterans of the animation and video game industries. The award-winning animation studio is based in beautiful Québec City, Canada. Alongside its own animated series, Cracké, the Squeeze team have also worked on big-name titles in both film and video games, including the trailer for Assassin's Creed IV: Black Flag – Freedom Cry. Driven by artistic creativity and a desire to compete with the best studios in the world of 3D character animation, Squeeze Studio has a team of 50 talented and passionate creators, who give life to epic characters using the magic of 3D animation.

animator on Cracké, developing the expression sheet and sharing tips for animation styles and facial performance with the team, and he'd recommend Squeeze as a great place to work for any animator who wants to up their game. "At Squeeze, our environment is driven by the quality of animation," he says. "So if you are an animator who wants to be challenged every single day and reach your maximum as an artist, then this is the place to work!"

Having a great working environment is absolutely vital for Squeeze, says production director Emmanuel Laurent.

"For me, the most important things at work are a good project, a good laugh and some challenges," he explains, "If you have that, you have a nice place to work."

Emmanuel recognises that everyone at Squeeze has a part to play in the creative process. "Everybody is part of the team. And in a team, everyone is important." Currently working on the second season of Cracké, as well as getting ready for some animated feature films, Emmanuel is prepared for a busy time ahead. "It's a very busy month, year... decade!" he enthuses, and he's not alone in that view.

"If Squeeze's first four years have been marked by tremendous growth, from five to 50 employees, 2016 will even be crazier," says Denis. "Our challenge is to recruit the best talents and to implement best practices to move our major projects forward while maintaining our quality standard and our culture. Growing while keeping our unique identity!"



To learn more about Squeeze and see more of the studio's work, visit [www.squeezestudio.com](http://www.squeezestudio.com).

## EMMANUEL LAURENT

Emmanuel is a production director at Squeeze with more than 20 years' experience in the industry.

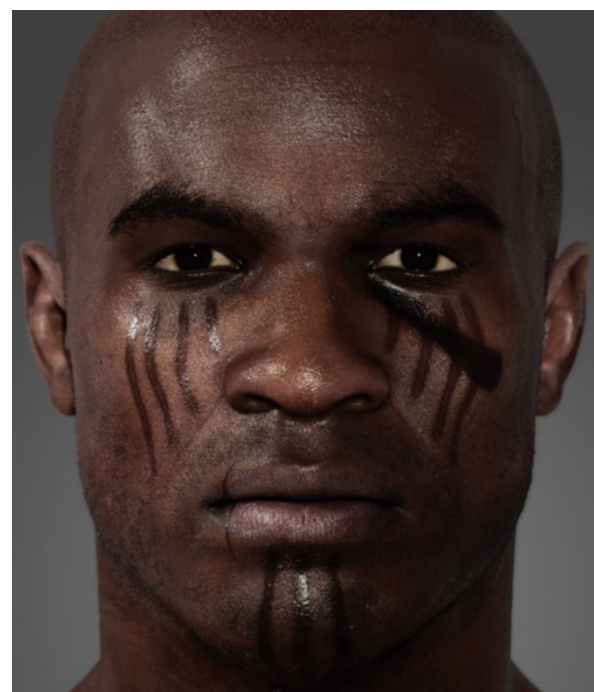
He's worked on a variety of major animation movies and over 600 TV episodes.

[squeezestudio.com](http://squeezestudio.com)



## CRACKÉ

Created and produced by Squeeze, Cracké is a 3D TV animated slapstick comedy coming to life in 2016 through a television series, a mobile video game and a mobile animated comic book.



## ASSASSIN'S CREED IV: BLACK FLAG – FREEDOM CRY

Squeeze worked on the Assassin's Creed IV: Black Flag – Freedom Cry reveal trailer. It won Best Video Game Trailer at the 2014 Golden Trailer Awards, in collaboration with Ubisoft Quebec and Sunny Side Up Creative.



## FERNUTZ

Squeeze created Fernet, a farmer with a bold personality. From shuffle dance to Gangnam Style, his enthusiasm has no limits, and he's available in a set of live wallpapers for Android devices.





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# THE THOUGHT THAT COUNTS

Inspired by **Fabio Cavalcanti's** webcomic, **Jacob Frey's** short *The Present* is a heartwarming look at the gift of friendship built through common ground

## JACOB FREY

Jacob recently completed the Talent Development Program at Walt Disney Animation Studios, where he worked as an animator on the feature film *Zootopia*.  
[www.jacobfrey.de](http://www.jacobfrey.de)



After stumbling upon an English translation of a Portuguese web comic by Fabio 'Coala' Cavalcanti ([www.menthirinhas.com.br](http://www.menthirinhas.com.br)), Jacob Frey decided to use the premise for his thesis short at the Institute of Animation at the Filmakademie Baden-Württemberg. "Seeing Fabio's comic I immediately knew I had to make a short out of it," he says. "The story was simple, full of emotions and had a great twist at the end. It was screaming out to be turned into an animated short."

Taking inspiration from Pixar and Disney, *The Present* was Jacob and his team's attempt at getting as close as possible to the high quality of a major feature animated film.

## VITAL STATISTICS

### TEAM

Direction, animation and screenplay  
**Jacob Frey**  
Character design  
**Max Lang**  
Shading, lighting and rendering  
**Markus Kranzler**  
Visual development  
**Bin-Han To**  
Character modelling  
**Anja Wacker**  
Compositing  
**Falko Paeper and Matthias Bäuerle**  
Sound design  
**Marco Manzo**  
Soundtrack  
**Tobias Bürger, Sarah Kämmerer**  
Rigging  
**Pascal Floerks, Hanna Binswanger and Polina Bambi**  
Producer  
**Anna Matacz**

### SOFTWARE

Maya, RenderMan, Nuke, HIERO

### PRODUCTION TIME

One year

### What was the hardest job?

Definitely managing the entire animation. To animate three minutes with two characters, one being a three-legged dog, was a challenge. You can increase your weekly animation target by dropping the quality, but that wasn't something I wanted to do. Luckily I already worked in commercials and had just finished work on the Oscar-nominated short *Room on the Broom*, so knew my realistic animation target. With a small team I had to plan smartly. I created all necessary assets at the start to focus on the animation.

### Can you talk us through your pipeline?

We used Maya as our main software package to model, rig and animate the characters and rendered everything with RenderMan 18. We used Yeti Fur for the dog's fur and the boy's and mom's hair, as Pascal Floerks had already tried various



fur pipelines for his own thesis short, *Bär*. Yeti Fur is easy to use thanks to the Node editor, and offers great grooming tools. Mari was used for texturing and Nuke 8 for compositing. Finalising was done in HIERO, which is an amazing tool; its direct connection to Nuke allowed us to render image sequences directly via the Royal Render renderfarm – a huge time saver.

### What was the most impressive technical aspect and how was it achieved?

The lighting and rendering was the most technical aspect. We had fur, displacements, subsurface scattering and a huge number of objects in the scene. We also used single bounce GI and in the end a frame took roughly 60 minutes to render. To minimise iterations we rendered a simple Ambient Occlusion pass early on and had Bin-Han To draw lighting moods for the key shots. With these images we already created an interesting shadow/light concept, which saved a lot of time in lighting. For the shading we used the Physically Plausible

shader and the RMS\_Hair shader for the fur/hair. Most lights were simple Geometric Area lights.

### What lessons did you learn?

Overall the production has been smooth. RenderMan was a bit intense when setting up and seemed a bit complex for a student short, but once Markus Kranzler figured it out it was a stable and reliable tool. The RenderMan support team have also been great. We also learnt it's never good when only one person's able to control a tool, and it's better to go home early and start the day with a fresh mind!

### What's next for you?

I just completed the Talent Development Program at Walt Disney Animation Studios in LA, where I was an animator for the film *Zootopia*. I'm soon moving to Berlin to work as an animator for MLP, who created the Oscar-nominated shorts *The Gruffalo* and *Room on the Broom*.

**FYI** Watch *The Present* online at  
[www.vimeo.com/152985022](http://www.vimeo.com/152985022)

The story was simple, full of emotions and had a great twist at the end. It was screaming out to be turned into a short



1 All 52 shots were animated and rendered by two people – the team was very small. Smart scheduling and a reliable pipeline proved essential.

2 There were over 2,000 objects in the set. RenderMan 18 helped us to manage this data.

3 Two characters had hair and one had fur. Yeti Fur is an intuitive tool to simplify the grooming process, and integrated well into our pipeline.

4 A frame took about 60 minutes to render. With Royal Render renderfarm we could use every computer at Filmakademie, which was a huge time saver.

5 To achieve good deformations when the dog sat down, we used Pose Space Deformer to add corrective blend shapes to the rig.



## ABOMINABLE SHOWMAN

For my previous short BOB, we used Shave and a Haircut for the fur but it was tedious to groom and render. So Pascal Floerks tried ZBrush; FiberMesh was used and the curves then exported into Shave and a Haircut within Maya. The pipeline worked but made adjustments complicated. Pascal then found Yeti Fur and convinced Filmakademie to buy a few licenses. It has great grooming tools and the Node editor gives total flexibility and control. The results were amazing and it incorporated perfectly into the RenderMan pipeline. For ambient occlusion, we prebaked a point cloud and converted to a Ptex file for smaller memory footprints and faster lookups.

6 We rendered the most common camera angles as an Ambient Occlusion pass and used Photoshop to create lighting moods. These helped us save time during lighting.

7 For the carpet we created a custom shader with a rough displacement and another fine displacement on top of it – then populated a fine layer of fur over it.





"There was definitely a bit of adaptation as we got into the project, mostly with changing decals on the car and moving trees around to get the dynamic renders," says CG artist Luke Reade

We also took the day to go to Brands Hatch to shoot the HDR images

## ARTIST INTERVIEW

# MINI MARVEL

Improve your work by focusing on what you love, advises Luke Reade

Finding inspiration to make great art is always the hardest part of starting a new project. For Luke Reade, a 22-year-old CG artist working in London, the subject was staring him in the face, or rather, sat in his garage.

"I have always been into my cars and I love racing," says the artist as he reveals the origins of his latest project, Mini Challenge Full CGI. "I currently race in the Mini Challenge and this is a replica of my car. Me and my colleague Sam Milner put our heads together to come up with the idea."



### LUKE READE

Luke is a CGI and retouching artist who has worked in the heart of London in a creative company since 2010. He's passionate about producing quality images in a variety of software.  
[www.bit.ly/207-mini](http://www.bit.ly/207-mini)

The project took two months "on and off" for Luke and Sam to model and render the mini in action. Modo

was used for the CGI and Photoshop for the post effects. "I have been using Modo for a few years now and it is a great application. I find it very fluid and its render engine in 902 can produce very realistic images," shares Luke.

When working on car renders, achieving a realistic and readable sense of speed in the scene can always be the crunch between success and failure. "There was a fair amount of trial and error on getting the motion right without the car looking like it was going too fast or too slow," says Luke. Animating the car and wheels moving through all the scenes at the same speed proved challenging: "We made sure the camera was set up properly

as per the real world to get realistic motion. We also took the day to go to Brands Hatch to shoot the HDR images; this was very time consuming, but key to the end result."

That's not to say creating an eye-catching still render isn't a challenge too. The result for the duo ended up being a unique top-down view of the mini speeding through a turn. "We had been playing around with various angles trying to get something dynamic," says Luke, explaining: "We wanted to make a unique image that stood out from normal photography."

**FYI** To see Luke and Sam's mini project visit [www.bit.ly/207-mini](http://www.bit.ly/207-mini)



Weta Digital needed to translate Deadpool's sense of humour through his disguise



## INDUSTRY INTERVIEW

# MASKING THE MERC WITH A MOUTH

*Alice Pattillo* finds out how Weta Digital brought the animated expression to Deadpool, despite his distinguishing disguise

Adding convincing movement and showing character through a mask is a tall order, especially considering the wise-cracking hero in question. Deadpool is known for his animated sense of humour, which needed to be translated through his disguise, and the team at Weta Digital have most certainly managed to pull it off, considering the latest Marvel flick smashed the box office and opened to rave reviews.

The team animated the mask in green screen plates and delivered the finals to other companies to do the rest of the compositing. VFX supervisor, Charles Tait explains the process.

"Initially we were sent a Maya file from the client that contained facial blend shapes (modelled at Image Engine) for the Deadpool head. From that file we exported an .obj file for each blend shape and one for the Neutral Pose head. We projected a UV Ramp on each model and unwrapped the result to create texture maps."

Once they had all these blend shape images prepared, Charles and co built them into a Nuke group, but the process could be quite a challenge, with the change in the mask's topology not always apparent. "The wrinkles in his forehead were quite detailed in the models, but a warp on the plate

wasn't enough to show off this detail." So once the animation was done, the team exported their keyframes to a corresponding rig in Maya.

### Laughing stock

Weta Digital had video clips of Ryan Reynolds delivering every single line – one for each shot the team were animating – which provided a wealth of visual information for them to use.

"We transferred Ryan's synchronised expressions to the mask, and obviously had to use a little artistic judgement to make sure the intent came across well," Charles continues. "Part way through the project, Jonathan Rothbart said that the film makers were all beginning to laugh at it again. Obviously when you've

seen and heard all the gags hundreds of times they become less amusing, but the expression we applied to the mask brought the humour back to life for them. At this point we really knew we were getting it right."

With access to these dialogue shots, Charles knew from the get-go how successful the flick would be. "It was obvious that this was no ordinary super hero movie," he says. "I sometimes think of how few pixels we changed in real terms, but how much of an effect it had. The fact that our work was so well received by the writers and all at Fox, was the most rewarding thing about our involvement in the film."

**FYI** To see more of Weta Digital's work, go to [www.wetafx.co.nz](http://www.wetafx.co.nz)

#### CHARLES TAIT

Charles is head of compositing/VFX supervisor at Weta Digital. He has previously worked on Marvel titles such as Iron Man 3 and The Avengers [www.bit.ly/207-tait](http://www.bit.ly/207-tait)







## EXPERT PANEL



### **Jason Knight**

Jason is a freelance digital artist with over 33 years' experience. Today

his paint brushes sit neglected while his Wacom tablet receives much love!

[www.knightgraphics.daportfolio.com](http://www.knightgraphics.daportfolio.com)



### **Francis-Xavier Martins**

Francis-Xavier is a character artist and

CG generalist, with over a decade of experience in games, media and TV.

[www.polyjunky.com](http://www.polyjunky.com)



### **Dennis Haupt**

Dennis has been using Blender for eight years and works as an

animator at InGAsys where he uses Blender Game Engine.

[www.3dartdh.wordpress.com](http://www.3dartdh.wordpress.com)



### **Pietro Chiovaro**

For the last few years, Pietro has worked creating 3D assets and

environments, and is currently working on an open-source game.

[www.bit.ly/pietro-chiovaro](http://www.bit.ly/pietro-chiovaro)



### **Josh Lynch**

Josh is an environment artist at Infinity Ward. He has seven years of

experience working on various game titles and platforms.

[www.josh-lynch.com](http://www.josh-lynch.com)



## GET IN TOUCH

EMAIL YOUR QUESTIONS TO  
[ian.dean@futurenet.com](mailto:ian.dean@futurenet.com)



## ARTIST

# Q&A

## Your software queries solved by our CG experts



**DRESSED TO KILL**  
Build a rich wardrobe  
for your digital  
characters using  
Marvelous Designer



## EXPERT TIP

### 2D Patterns

The 2D pattern window in Marvelous Designer is similar to a UV editor; you have the X and Y axis, without Z. Your patterns lay flat in the 2D window, as if laying out pieces of cut fabric. Buttons above the 2D window pertain to functions in the 2D workspace.

## MARVELOUS DESIGNER

### How can I create realistic clothes for my 3D character?

Simon Bentley-Cox, UK



#### Jason replies



So, you spent a significant amount of time creating a fancy 3D character. Maybe you even gave her some hair to cover up that bald head that is common in 3D renders.

Nice work! I suppose you could consider the project done at this point, depending on what type of image you may be trying to make. For me, I see one big problem. My 3D character is standing around naked wondering if I am ever going to put some clothes on her. So what now? You could spend hours sculpting a 3D dress and perfecting the folds and wrinkles, but if you decide to change your character's pose later you may have to start over. I am here to tell you that there's an easier way.

Unless you've been living under a rock somewhere, you've probably heard about Marvelous Designer (MD) by now. I recently began using Marvelous Designer to develop clothing for several images, including this classic portrait image titled Bird Set Free.

I am neither a seamstress nor a tailor. I know nothing about how clothing is actually created. Because of this,

I am new to Marvelous Designer, but I find the interface surprisingly easy to use considering how powerful it is

I try to keep things as simple as possible. I always start by finding concept art or sketching out and refining my idea. After that I lay out a simple pattern in Marvelous Designer using basic shapes.

I am new to Marvelous Designer, but I find the interface surprisingly easy to use considering how powerful it is. I was able to make my first garment within minutes of opening Marvelous Designer for the first time. I found it helpful to first create and layout my garment on the default 3D character in Marvelous Designer before trying to import my own character and apply the clothing. I always start with basic shapes first and add more detail as I go along, focusing on areas that will be most visible in my final still image.

### STEP-BY-STEP MAKING THE DRESS

#### ONE SET THE CONCEPT

I take a render of my character and place it on my tablet so I can test ideas on the go. I pop it on a new layer in Sketchbook and carry it around for a few days, sketching and trying lots of ideas and colours until I come up with a concept that I am happy with. In the case of this image, I tried several variations, but opted to stick with a fantastic concept by artist Kelly Vivanco.



#### TWO START WITH THE BASICS

I find it helpful to start with basic shapes on the default 3D character in MD. In the March 2016 Issue (#205), Camille Kleinman from CG Elves shared her process for creating a realistic dress in MD. Her comprehensive and easy to follow tutorial will most certainly help demystify MD for experts and beginners alike. If you don't already have a copy of Issue #205, I recommend grabbing one.



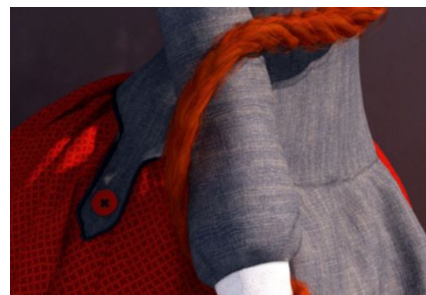
#### THREE REFINING THE DESIGN

I import my posed 3D character to MD (as an Avatar) and apply my basic garment. I adjust the garment to fit my character and begin fine tuning the design. I add subtle details to make the dress more unique, staying true to the original concept. I finish up in MD by applying appropriate fabric and simple textures, draping the garment, and exporting as an .obj file.



#### FOUR FOCUSING ON THE DETAILS

I add finishing details in my favourite 3D software, in this case, a button and better textures. Excellent textures help hide imperfections in the clothing and make the dress more realistic. To help me understand what I was trying to achieve, I went to my wife's closet and examined her clothing. In Photoshop, I added stitching along the seam lines using a stitch brush; this hides where the textures come together.







## EXPERT TIP

**Baking out**

If you animate something with constraints in Blender you should bake the animations to get the result you want in other programs like Unity 5 or Unreal 4, so before you hit the export button bake all bone constraints to key frames and clear all the bone constraints from the Armature in one process.

To do this, go to Pose> Animation> Bake Action.



## How do I rig a vehicle in Blender?

Dimtri Romakovich, US

**Dennis replies**

I am often asked how I made the rig for the animation of my futuristic combat jet on

Sketchfab, so I'm happy to be able to share the answer with you here. I want to show you how a bone constraint works in Blender and how to set it up, and also how a bone constraint affects the animation skelton.

To demonstrate this, I will explain how I adjusted the Action and the Track To constraints on the front landing gear of my model (the other animated parts of the plane are made in the same way).

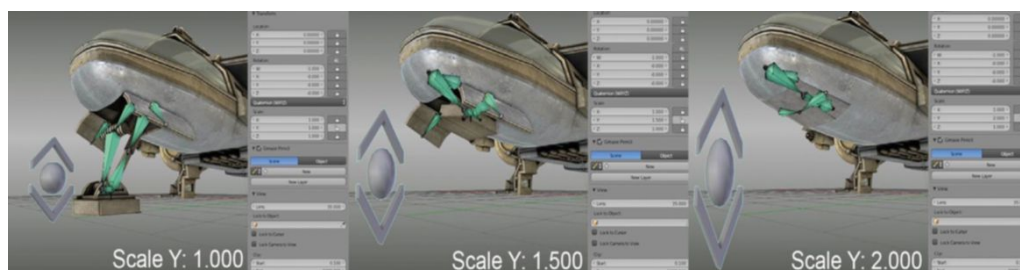
By scaling the control bone from

In Target Range you can define the interaction range of the control bone

1.000 Y to 2.000 Y, the front landing gear will move into the plane by driving a predefined action. All animations of the plane are saved in one action.

To assign a bone constraint, select the bone for the Action Constraint, then go into the Bone Constraints section and click on Add Bone Constraint. Now select the Action and set up the Action Constraint.

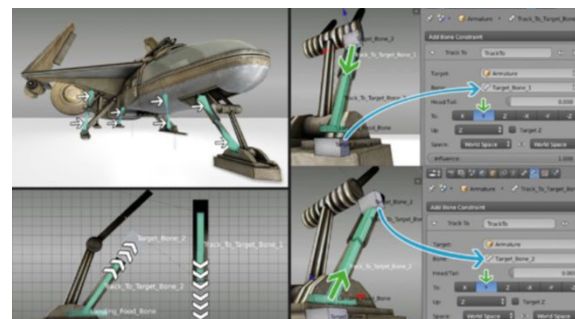
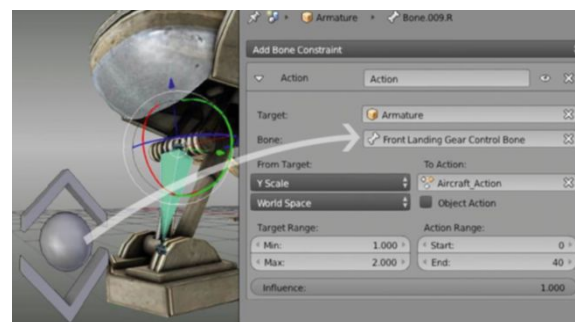
To set up the Action Constraint first select the target (the target is the



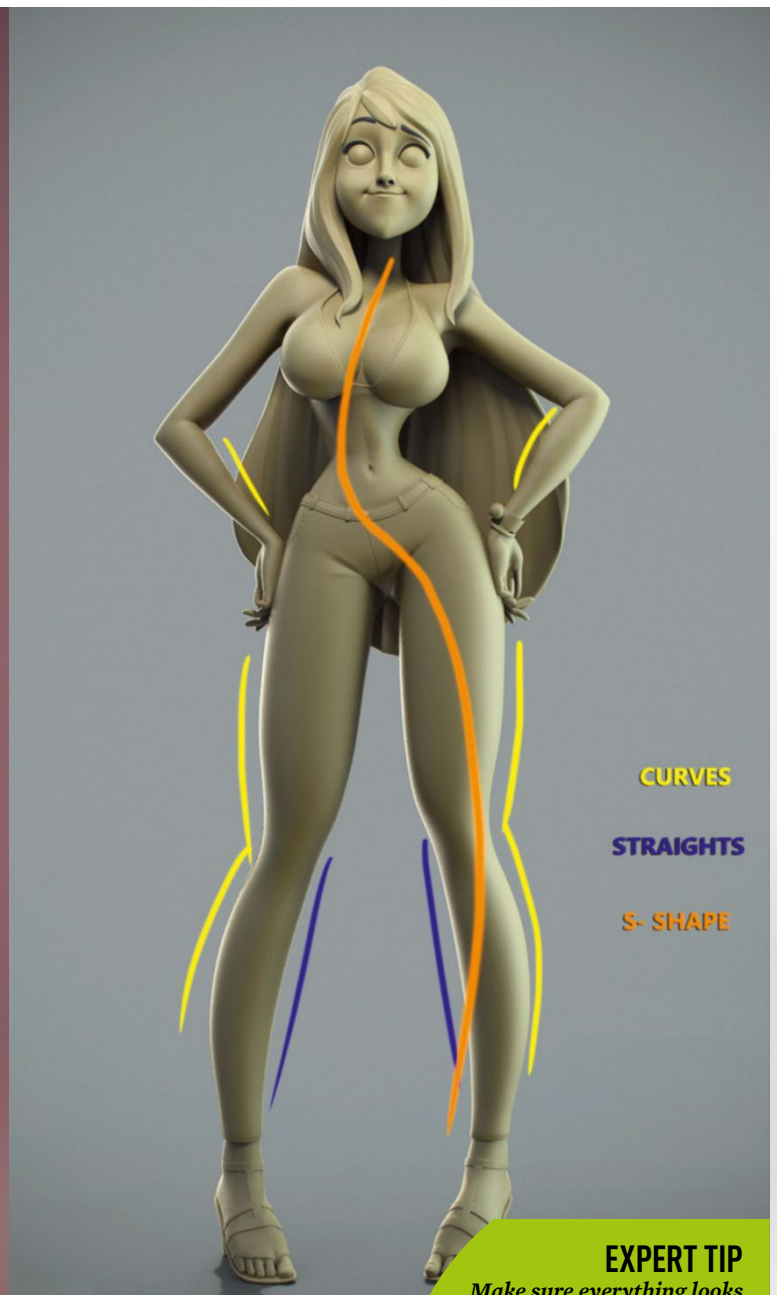
Learn how to adjust the Action and the Track To constraints so that you can control all the parts to create your own combat jet animation

armature object). Now set the bone by entering the name of the bone or the object you want to use for controlling the constraint.

The From Target setting defines how to interact with the constraint; in my model, I use Y scaling. In the To Action setting you need to enter the name of the action you want to use for the constraint. Next, in the Action Range you need to enter the start and end frame of your Action. In Target Range you can define the interaction range of the control bone. Finally, I use the Track To Constraint setting – Track To Constraints are perfect for animating hydraulic elements. If you would like to see in more detail how I rigged the entire jet animation, please visit [www.bit.ly/207-blender-rig](http://www.bit.ly/207-blender-rig)







**CURVES**

**STRAIGHTS**

**S-SHAPE**

### EXPERT TIP

**Make sure everything looks good 'in the round'**

When sculpting or creating any character, cartoon or otherwise, it's important to not just check it looks good from the front and side view, but also from above and below. Sometimes we forget this and wonder why our models look slightly off. Once all the views are locked down, the form will be ready for detailing.



## How can I best translate a 2D cartoon concept into 3D?

Hussain Rayne, UK



### Francis-Xavier replies

To answer this question, I'm going to use a cartoon piece I recently finished (based on a concept by Gop Gap) as an example. It's essentially Nami from the manga One Piece, but I decided to 'Disney-fy' her a little.

When it comes to making cartoon characters in 3D from any concept, it's important to make it appealing. If it's for animation in a TV show, advert or film, the odds are that it will be seen from different angles. What looks good from the front view may not look good from the side or the three-quarter view.

I followed the principles of curves versus straights quite a bit in this piece, especially on the limbs. One side is usually curved and the other is straighter. This technique is utilised in a lot of films

by Pixar: it works really well and gives their characters dynamism on the screen.

I push the pose to try to get a nice S-shape. This accentuates the curves and makes the character look more appealing.

**The S-shape accentuates the curves and makes the character look more appealing**

Using ZBrush, it's easy to play with proportions. I used the Move tools to make sure it looked similar to the concept, but was unique enough in 3D so as not to be a complete copy of it.

I started out in the T-pose and then used the Transpose tools with some masking to bend the limbs and fingers.

For the expression, I wanted to capture the quirky smile of the original, so it was a case of using the Move tool in ZBrush until I got it.

Once the major forms and gesture were done, I went in smaller; tweaking the finer details. I wanted to get the clothes, colours and lights right.

This all depends on the concept you're working with, however, the principles apply to most 3D cartoon pieces: Getting the form, curves and straights; capturing the gesture; and making sure the figure works in the round or from all angles.

The most important skill needed here is a knowledge of human anatomy. While it is a cartoon piece, the character is still grounded in reality, and if you intend to bend the rules, you should know about them in the first place!



## ARTIST Q&A

## EXPERT TIP

**It pays not to be possessive**  
Being able to take feedback and criticism in good spirit is pretty important. You can't be precious about your work either. There's no telling when an asset you've been working on will turn out to be going in completely the wrong direction and needs changing. Maybe it'll be scrapped altogether, but that's just the nature of things.



## What does it take to be an environment artist and how can I reduce noise in textures?

Alexander Pleasey, US



Josh replies



There are several skills an environment artist needs to successfully create CG for video games. In any given day, you could be handed a basic blockout to be completed, which requires you to build props, create materials and handle the area lighting.

The ability to build a functional environment that respects the intended gameplay for the area is the foundation for everything going forward. It is important that an environment artist learns traditional art skills to ensure that the CG is believable; that is why artists in this field are adept at modelling, texturing and set dressing.

For any given project, you'll have to work within a budget; and overcome limitations such as memory load and performance issues that can affect assets. Finding ways to make the right

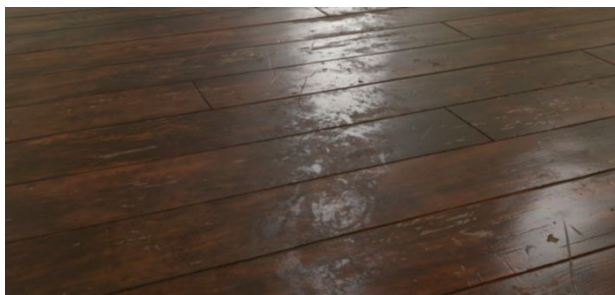
optimisations, without sacrificing the look of the environment, becomes very important. Understanding and working within those limitations goes a long way to being successful in this field.

You'll also need to know your way around PBR textures; you'll need to

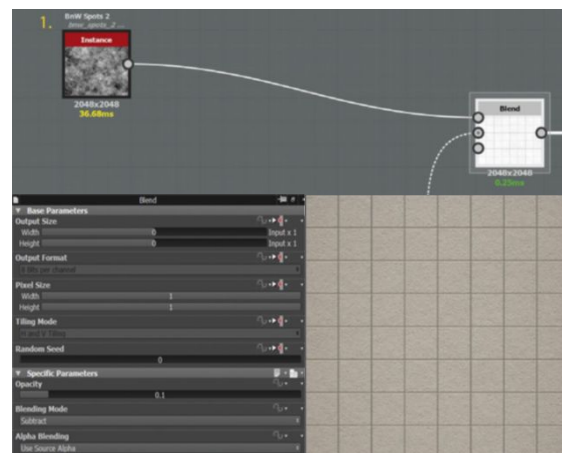
Finding ways to make the right optimisations, without sacrificing the look of the environment is important

understand how PBR shaders work along with studying the properties of real materials, and how they react to light. It is also important to understand that each channel of the material has a unique role to play.

By adding just a few nodes, noise can be controlled easily to create a more selective and dynamic result. With it, the end result feels more natural, balanced, and invites the viewer in instead of distracting them

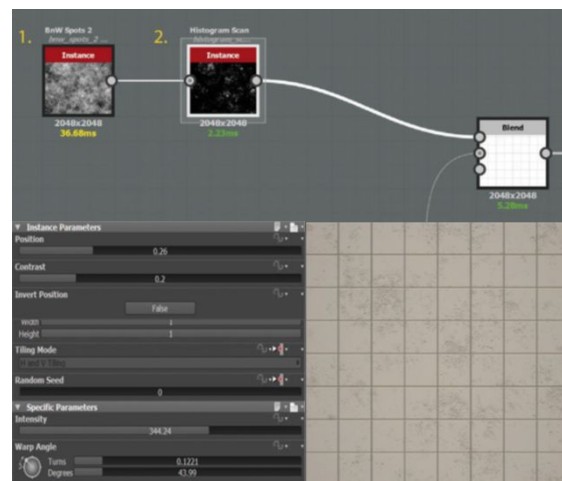


## STEP-BY-STEP REDUCING NOISE IN TEXTURES



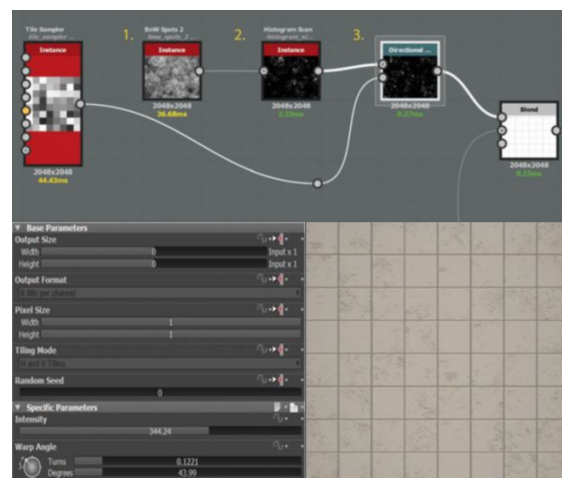
### ONE ADD A NOISE NODE

First, bring in a noise node, BnW Spots 2, and plug that into the Blend node with the Blending Mode set to Subtract and an Opacity of 0.1. As you can see, noise covers the entire surface and flattens everything out, almost to the point where the edges of the tiles aren't even apparent.



### TWO ADD A HISTOGRAM SCAN NODE

Next, to help alleviate this global level of noise, bring in a Histogram Scan node. By adjusting the Position and Contrast values a lot more control is gained and instantly the details become more selective. However, it still looks as if a general noise has been laid onto the tiles.



### THREE SCATTER THE NOISE

Finally, add in a Directional Warp node. Here, plug in the Output from the Histogram Scan node into the Input, which is the top connector. Then create a multi-valued greyscale map that matches the amount of tiles, then plug that into the Intensity Input (the bottom connector). The greyscale map acts as a driver to push the detail around and scatters the noise.



Discover how to turn a photo into a seamless, tileable texture in Photoshop



## EXPERT TIP

### *Keep an eye out for imperfections*

When you're taking the photograph of the brick wall that you want to turn into a texture, make sure you choose one that hasn't got too many imperfections, as these can lead to problems when we come to trying to unwrap it later.



## How can I create a brick texture?

Vivienne Lotts, UK



### Pietro replies

Before we create a texture, we have to choose what approach to take. There are two main ways: The first is to sketch the texture entirely, (this is the more difficult solution and is principally used to create textures for cartoons). The second is to take a photo of the real object that we want to create, and then edit the photo with photo-editing software, such as Photoshop. The latter solution is used to achieve a photorealistic result.

For the creation of this house's brick texture, I started by using a photo I had taken, that I then edited in Photoshop. During the editing process, essentially you just want to adjust the colour of the texture, but first of all, you have to take the photograph!

A photo that is destined to become a texture is not simple to take; we have to consider two essential elements, symmetry and light.

Starting with symmetry; it's important that we take a photo from the correct position, so if we want to create a brick texture from a photo, it's important that we put the camera parallel to the wall.

The brick texture was easily created in Photoshop by manipulating a photo



The second element that we need to consider during this process is the lighting. It's very important that light in the scene is homogenous. For this reason I recommend that you do not use the flash when taking your shot.

Now that you have taken the photo, you can move on to the process of editing it in Photoshop, for example. Here, essentially, you are going to fix the colour of the photo and, in particular, the colour saturation, the contrast, the colour temperature, the shaders and the sharpness. All of the values of these elements depend on the photo that you have taken. There

A photo that is destined to become a texture is not simple to take; we have to consider two essential elements, symmetry and light

are not specific values to follow, in every case the advice I'd give you is to not exaggerate, but instead, try to keep the values close to the default values of the software that you are using.

Now that you've completed this photo-editing process, the brick texture is ready to use in your CG work, try the process for yourself.



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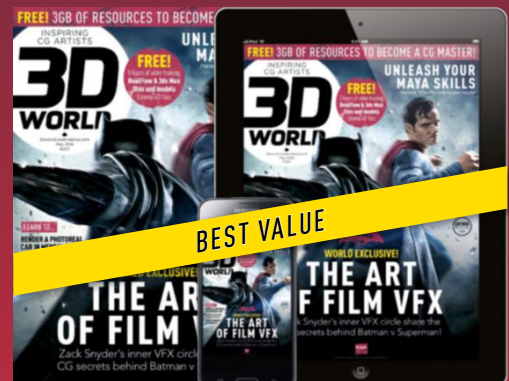
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# ALL STAR VFX

**Trevor Hogg** comes face to face with the creative minds behind  
Batman v Superman's blockbuster VFX and SFX





I have always had a tendency to like more mythological creatures than anything else

*Patrick Tatopoulos, production designer*



Overseeing two iconic superheroes coming together for the first time in movie history is filmmaker Zack Snyder, who has assembled a team of cinematic talent that includes three veteran collaborators and an inner circle newcomer for Batman v Superman: Dawn of Justice.



"It's evolved to the point where Zack feels good about bringing me in on an early and deep level," notes visual effects supervisor John 'DJ' DesJardin who has worked on every film by Zack Snyder since Watchmen. "We like to look at what Patrick Tatopoulos is designing in terms of whole concepts and then we'll work with him to say, 'You just need to build this little bit here because it's the only part that any of the actors will interact with. All that other stuff we will build out later in CG.'"

### Tools of the trade

The modern tools such as CAD, Maya, Photoshop and ZBrush are utilised by the visual effects and art departments. "A



designer is no longer just a guy who builds things," observes production designer Patrick Tatopoulos who has never before collaborated on a project directed by Zack. "There are concepts and designs that will never make it to the practical world but they will be connected to the CGI world." New technologies also assist

costume designer Michael Wilkinson, whose creative partnership with Zack dates back to 300.



"I sketch and collage on the computer, and then work with talented digital artists to create detailed illustrations. We scan our actors digitally and produce exact life-size mannequins of them. We draw elements of the costume using 3D modelling programs, and print them by using 3D printers. We create fabrics from digital artwork using dimensional inks," says Michael.

Storyboards created by Zack serve as the Bible for his movies.



"A lot of times it's just a discussion between DJ, Damon Caro [stunt coordinator and 2nd unit director] and I about what the storyboard needs," remarks SFX supervisor Joel Whist, who previously



Zack Snyder's Superman is an advanced version of the Superman that fought at the end of Man of Steel





# LIGHT UP THE SCENE

The importance of heat vision, Doomsday's blast and glowing eyes

"I like the idea of the heat vision being a very violent thing for Superman to be able to turn on," reveals John 'DJ' DesJardin. "It comes from deep within and is a discharge of energy so you get a lot of subsurface glow where you can see into the head of Superman, like some of the bone and blood vessel structures. We discussed the detail of whether

Superman can actually see what he's aiming at. We're not really sure that he can because it's such a violent thing."

Batman almost gets annihilated but is saved by the intervention of an Amazon princess. "We handled Doomsday's blast the same way as the heat vision with Superman," notes DJ. "Wonder Woman deflects the blast with her

shield. It heats the shield up and then dissipates."

The Dark Knight has glowing eyes when wearing his armoured suit in his battle against the Last Son of Krypton. "That was a cool thing that Michael Wilkinson and his team helped us with because he had to be able to see out of his eyes during the fight," says DJ excitedly. "But we knew

that we wanted this glowing lens effect in it. Michael put a little strip of LEDs around the interior of that eye opening so that it would glow up the costume and even throw a little bit of light on Ben's eyes. Then we put the actual lens in by CG. What's great is that you can sometimes see Ben's eyes in there."

There is a lot of subsurface glow from Superman's heat vision; we are able to see the bone and blood vessel structures of his face as his power lights-up







## Witnessing Batman and Superman being drawn into an epic clash of power and ideology is truly a major cultural event

*Michael Wilkinson, costume designer*



*The inspiration for Batman's iconic suit came from Frank Miller's 1986 four-issue comic book miniseries, The Dark Knight Returns*

collaborated on Watchmen, Sucker Punch and Man of Steel with Zack. "There's a big sequence where Batman takes out a bunch of bad guys to rescue somebody. The rough idea and geography of where this takes place was given at an early stage to Damon by Zack. Damon figures out all the moves that he needs to do within that space. From that techvis, his editor will throw in over-the-counter visual effects, like bullet hits, dust, and explosions. We all look at that and go, 'Do you want to do that all practically?' Sometimes there will be a safety call because it won't work in the space. Then there will be a discussion with DJ. 'What size element do you want? Is it three quarters or full-scale?'"

### Night and day

"Even if Bruce Wayne appears in the day the whole Batman language is about the night," observes Patrick of the latest

cinematic incarnation of the vigilante crime fighter portrayed by Ben Affleck. "I wanted to create layers of colour in our new Batman. There's still black in there but there's also a dark charcoal grey with more reflectivity that sometimes turns out as a warm or cool grey." An armoured suit makes an appearance. "Zack wanted a huge, hulking silhouette that would convey the sense that Batman had brought as much protection as he could to the ultimate confrontation with Superman," states Michael. "We were inspired by Frank Miller's armoured suit in The Dark Knight Returns. Two multiples were made of the suit and because of the size and weight of the costume, parts of it were replaced with digital pieces so that the stunt department could achieve their amazing choreography."

An iconic vehicle drawn on a coffee shop napkin by Patrick enabled him to establish the world of Batman. "For

It was easier to get the look of the Batmobile right as there was a physical reference that could be used for the digital model







# WHEN NOT TO CG IT!

Explosions, bullet hits and the skylight

SFX supervisor Joel Whist spent a year and a half working in Detroit. "We did a number of practical explosions in exterior locations. We did a lot of bullet and machinegun hits around Superman for one of the big fights between him and Batman. We blew up two or three of Batman's weapons that were used to fight Superman.

We had very hot and large diesel fires for the after-effects fires. A car was pulled into a fuel tanker that blew up."

Not all of the special effects involved explosions and bullets. "The skylight Batman smashes Superman through was a massive build of breakaway glass and gator boards," states Joel. "There were various iterations

of that gag. Batman has to kick Superman into the skylight and then he has to land. There's another shot of Superman in the skylight and then you have to have a shot of Batman jumping to Superman over the length of the roof and smashing him through.

For each of them we had three takes. On the day we had nine

full-sized breakaway skylights standing by to be lifted on the roof set, which was 30 feet in the air. We probably did half a dozen tests.

The breakaway glass was forged in LA and was 3D printed with a wireframe. Each one of the skylights by the time you built it, painted it, and put it on set cost around \$50,000."

The skylight fight scene between Batman and Superman required nine full-sized skylights with the breakaway glass being 3D printed with a wireframe

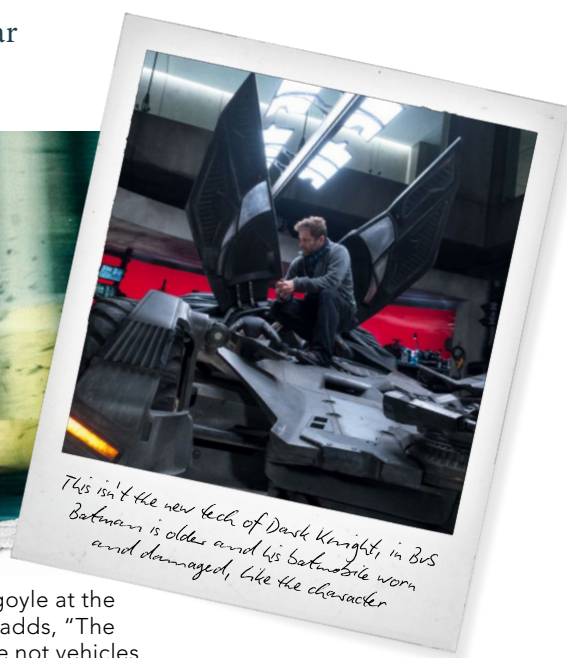






The Batmobile and Batwing are not vehicles that you take to look pretty in the city at night; they are made for war

*Patrick Tatopoulos, production designer*



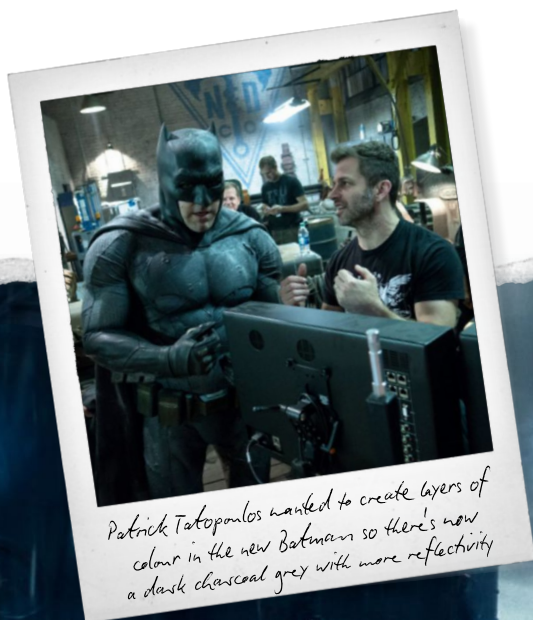
*This isn't the new tech of Dark Knight, in Bruce Batman is older and his Batmobile worn and damaged, like the character*

me, Batman needs to have a car that jumps, can go off-road anywhere and is completely controllable. My Batmobile can go low to the ground like a Formula One and the four wheels can swing out and raise the whole body to become an off-road racing vehicle," he explains. And Zack had a particular idea in mind: "When Zack was looking at the Batmobile he said, 'It's great but let's make it look grungy and repaired.'" The superhero also takes to the air. "The Batmobile and Batwing are tightly connected. I wanted to have the Batwing to have the wings that could be flat or be raised above the cockpit and become

almost like a hanging Gargoyle at the edge of the cave." Patrick adds, "The Batmobile and Batwing are not vehicles that you take to look pretty in the city at night; they are made for war."

### Feel the force

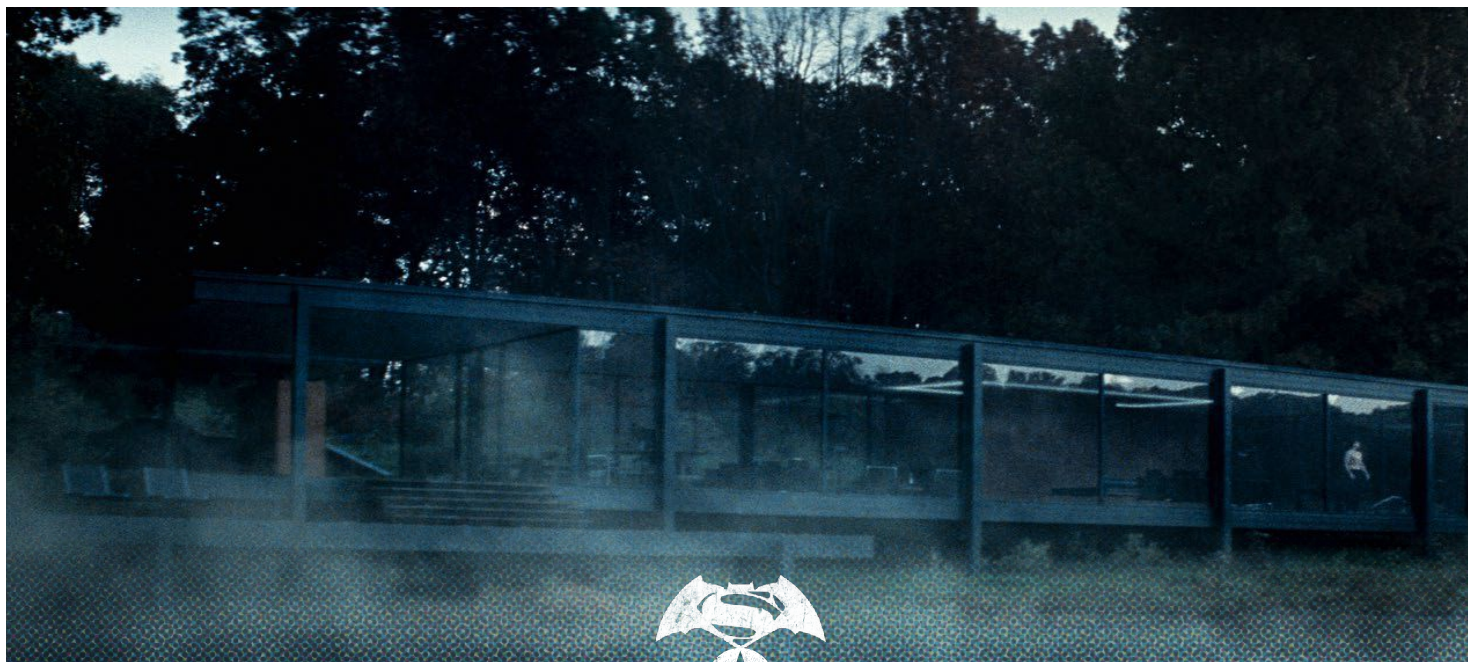
Star Wars is part of the filmmaking language for the production crew. "A lot of the conversations between Zack, Damon and I are, 'When Batman has to move the Batwing around the factory to do this let's Millennium Falcon it over this way!'" chuckles DJ who had to create 1,241 visual effects shots with the help of MPC, Double Negative, Weta Digital, Scanline VFX, Shade VFX, and Teamworks. "To the credit of Bryan Hirota and Scanline, he did a lot of modelling tests for me to see how they were breaking up surfaces into little flaps that would move around to show how the Batwing could move like that. The animation helped to connect it with a bit



*Patrick Tatopoulos wanted to create layers of colour in the new Batman so there's now a dark charcoal grey with more reflectivity*







# TO THE BAT CAVE

Production designer Patrick Tatopoulos talks about constructing the bat lair

## How did you go about devising the Bat Cave?

There's a house by the lake that is the new residence for Bruce Wayne, which defines a man who is connected to nature. Glass walls are everywhere. Our Batman is not building an opera house underground – the architecture is similar to the house outside. I also wanted there to

be nothing sitting on the ground. Every piece of architecture and furniture hangs from the ceiling. It's a constant reminder of the world of bats.

## Were there CG set extensions?

I felt that if I was building a cave to that level that I should be able to shoot all around without having to extend

it in CG. Ultimately, for one specific shot created in post-production, there's an extension for Batman to get to the cave. When I started to conceptualise the lighting with Larry Fong [cinematographer] I said to him that the cave should not be lit. It should be dark. The only thing that lights the cave is the place that he lives in.

## How did you physically support the Bat Cave set?

We had to cantilever all the sets and took a big chunk of another stage next to where we were building the Bat Cave. Luckily I work with Jonas Kirk [construction coordinator] and engineers helped us to find a way to support the Bat Cave so we could get exactly the look we wanted.



The new 'Batcave' is connected to nature and built below Bruce Wayne's retreat...



The nature theme runs into the underground structure - everything hangs like a bat





I like the idea of the heat vision being a very violent thing for Superman to be able to turn on... it comes from deep within

*John 'DJ' DesJardin, visual effects supervisor*



*The actors were scanned digitally and exact life-size mannequins were produced, explains costume designer Michael Wilkinson*

more of reality as you saw all those little surfaces move all the time. The Batwing didn't exist in real life. There was a buck for the cockpit but that was the extent of it. The Batmobile was easier to make look right because we had a physical version that we could use as a reference for our digital model."

Environment building was a major concern for DJ and his team. "Metropolis and Gotham don't exist. We used Chicago as a basis for Metropolis and Detroit as the base core of Gotham, but they're really cut apart. You can't point to all that much and go, 'There's a street in Chicago that looks like this.' There are so many artificial buildings and we try to get rid of the really recognisable ones. By the time you finish doing that you have large CG representations of these two cities and also how they relate to each other. As we go through building up this universe, now with the Justice League movies, we'll need to keep revisiting these locations and even build around them. It's important to me that we construct them in such a way that we can go back and render them again, and they'll

be recognisable in the context of the other films," DJ reveals.

Batman v Superman directly connects with its predecessor as the final battle between Superman and General Zod is recreated. "Not only did we reuse assets but I had the team at Double Negative that worked on the huge sequence at the end of Man of Steel," he explains. "To be fair



there are lots of different perspectives of that action so it's not as easy as 'Oh, look, this building collapsed at this angle so if we just bring the camera over here we can do it again there.' You can do that but you'd probably have to add a lot of detail to that angle as well." As to whether the criticism towards the amount of destruction featured in Man of Steel influenced Batman v Superman, DJ remarks, "It was important that much destruction went on because the point of our universe is, 'This is the reality of what happens when gods go to war with each other. It's not a pleasant thing. Humans and all of the things they've made pay the price.' Zack knew that we were going to be commenting on that in the sequel so it had to be that devastating."

Chicago and Detroit were used as the base for Metropolis and Gotham with the team creating large CG representations of these cities



*On set, Batman v Superman is filmed against green-screen so the CG cities and destruction can be added in later...*

### Girl power

Unlike her male counterparts, a female superhero makes a cinematic debut





# WONDER WOMAN

The importance of costume design

The Goddess of Truth appearing in *Batman v Superman: Dawn of Justice* was exciting for Michael Wilkinson as it's her first big screen incarnation, introduces Gal Gadot in the role and provokes the notion that many more superheroes may exist. "We wanted our Wonder Woman to be strong, confident and every bit the equal of the film's male superheroes. Zack talked about portraying her as a powerful,

intimidating warrior who has to stand next to Superman and Batman and be a serious presence. What makes her unique is that she balances this power with an equal measure of grace and majesty, and compassion. Gal Gadot brings the character to life with toughness and complexity."

"We wanted the costume to seem thousands of years old," explains Michael who manufactured five of them for Gal

Gadot to wear. "It was inspired by the metal armour of Greek and Roman warriors/gladiators with hand wraps, sword harness and lots of practical details that a fighter would incorporate into their setup. Much attention was paid to all the iconic details – lasso, sword, shield, headdress, and cuffs. We incorporated the classic eagle and 'WW' motifs, and replaced the classic five-pointed red star with gold

eight-pointed Greek star that honours her background. We did a lot of prototyping to find the right materials and construction techniques to achieve the look of metal and leather, but still allow for all the fight choreography. We combined time-honoured techniques with new innovations, such as using clay sculpting and digital sculpting, raw materials and complex fabricated materials."

Wonder Woman's costume was inspired by the metal armour of Greek and Roman warriors







We wanted our Wonder Woman to be strong, confident and every bit the equal of the film's male superheroes

*Michael Wilkinson, costume designer*



courtesy of Gal Gadot. "We went back to the comics for our version of Wonder Woman," remarks DJ. "She's not just an Amazonian from Themyscira but also has an extra elevation to her status in the universe where she is a goddess and immortal. We expanded upon her powers based on that idea. Superman is an advanced version of the Superman who fought at the end of Man of Steel; that essentially was the first fight in his life and now he has more of a reign on his powers and is still god-like. Our Batman is closer to Frank Miller's The Dark Knight Returns; however, we're not actually making that comic but that idea of him as an older more grizzled world-weary Batman had an influence right down to the shorter ears on the costume. He's actually bigger than Superman – that was the iconic graphic image Zack wanted."

## Take two

When it came to the business end of the movie, the epic finale, and our heroes need to save the world, DJ says there were creative revisions.

"One of the biggest challenges for me was when we got to the end fight with Doomsday," recalls DJ, who felt a particular long shot in the sequence wasn't quite working out. "We were approaching when that section was supposed to be done and I went back to Zack and said, 'I don't think you love this. I don't think I'll ever love it so let's tear it down again and go back in with Damon. Let's not change the fight choreography but change the camera. Let's make it more like the Snow Speeders versus the AT-AT Walkers in The Empire Strikes Back.' It became one of my favorite parts of the sequence and I'm so glad that we weren't so precious with that initial idea."

For DJ, who has been working on the Blu-ray version as well as prepping the broader sequel, Justice League, the wait is finally over. "I'm really excited for fans to see the fun way these pieces all connect, from the heroes fighting all the way to end."

## Icons clash

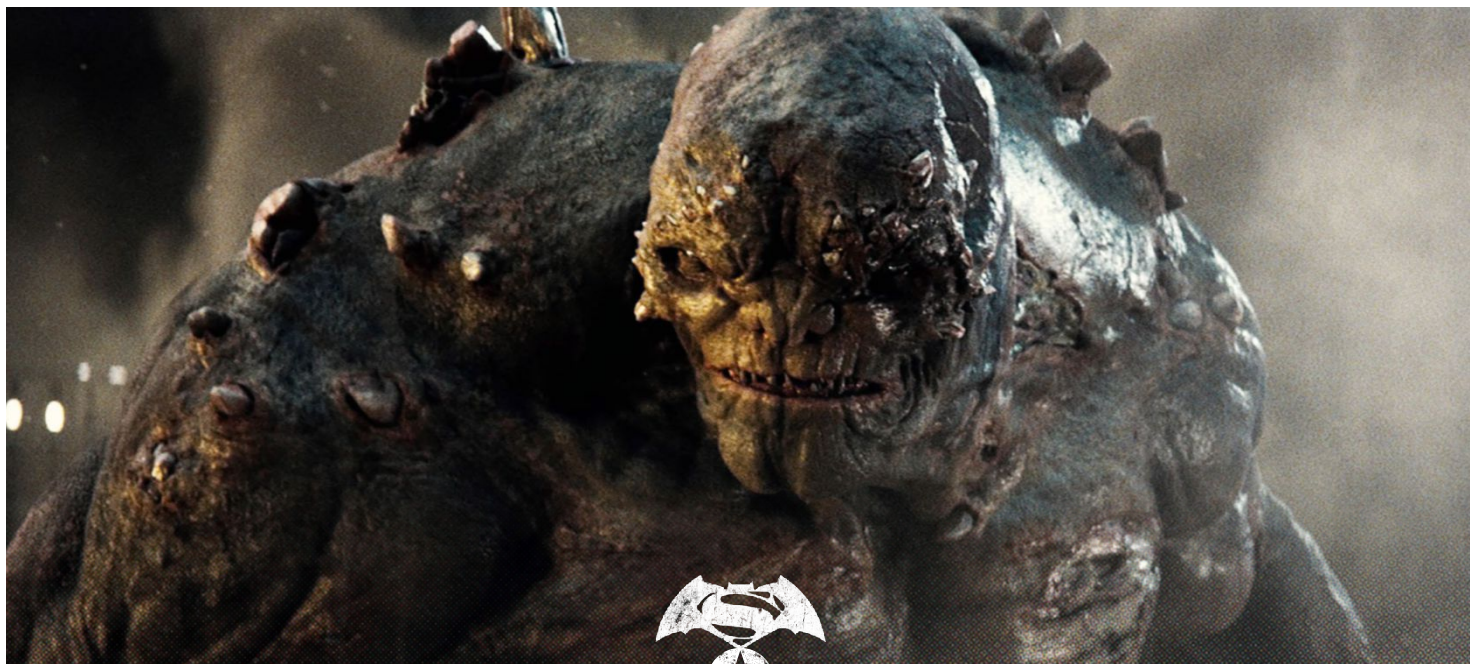
Costumer Michael enjoyed the opportunity of reinterpreting Batman and Superman. "Hands down the most exciting film project I've been involved with. It's the first time that the world's most iconic superheroes appear together on the big screen. Fusing these two incredible mythologies and witnessing Batman and Superman being drawn into an epic clash of power and ideology is truly a major cultural event that we hope will resonate with the DC Universe's legion of fans." The cinematic journey with Zack continues for Patrick. "When you come onto a project and there are a lot of things that become part of the aesthetic – sometimes you repeat it on the next movie. The great thing about Justice League, without revealing anything, is that there are a lot more characters coming on board and that in essence is an opening for so much more design work, which is phenomenal."

**FYI** *Batman v Superman: Dawn of Justice is in cinemas from 25 March*

Zack wanted a huge, hulking silhouette to convey the sense that Batman had brought as much protection as he could to the fight







# CREATING DOOMSDAY

Making Superman's nemesis

In an effort to destroy Superman, Lex Luthor unleashes a monstrous alien that lives up to the name of Doomsday. "Patrick did the initial designs," explains John 'DJ' DesJardin. "We had a sculptor that Zack liked make a maquette which was used for our main digital sculpture." However, the cinematic version deviated from original source material. "Doomsday in the comics is

a symmetrical beefy creature and Zack didn't want that; he wanted it to be more misshapen. The idea behind Doomsday is that this is a type of creature that Kryptonians know how to do, which is a doomsday device, but you should never do it."

Designing creatures is nothing new for Patrick Tatopoulos, however, he had to push himself in a different creative direction for Doomsday.

"I always have had a tendency to like more mythological creatures than anything else. There was always a sense of a child that had been formed in space. There's something weirdly naïve about it. It was great to see Doomsday changing in the third act; the power expands and explodes from within causing the body to become more solid and powerful."

A combination of live-action reference and CG enhancement was required to bring villain Doomsday to life. "Ryan Watson [co-fight choreographer] had a performance capture suit on and a head helmet facecam so we could record all of his movements. That formed the basis of the character but Doomsday also does a lot of superhuman things," remarks DJ cryptically.

DC's trinity line up to fight Doomsday in the third act of Batman v Superman





## FEATURE

*Creating realistic interiors*

# MORE REAL THAN REAL







**Alex York**

Alex is founder and director of Atelier York, a London-based architectural and design visualisation studio, with over 10 years' experience in the industry. The studio has worked with some of the world's best-known architectural practices, designers and developers.  
[www.atelieryork.co.uk](http://www.atelieryork.co.uk)



**Kerrie Hughes**

Kerrie is content manager for design website Creative Bloq. She previously worked as a staff writer for 3D World magazine and has since written regularly for other publications, including ImagineFX and Computer Arts.  
[www.creativebloq.com](http://www.creativebloq.com)

## How arch-viz company Atelier York used photoreal CG and Corona Renderer to transform a London apartment into a dream designer home

With a crisp white finish, timeless features and sought-after furniture, London apartment Seaford Court is the ultimate designer pad. But it didn't always look like this. When the owners decided to give the place a major overhaul recently, they enlisted the help of an interior designer and London-based architectural visualisation company Atelier York to visualise the new design in CGI and reveal its potential to the owner.

With a brief to refurbish Seaford Court to a very high specification, the designer – with Atelier

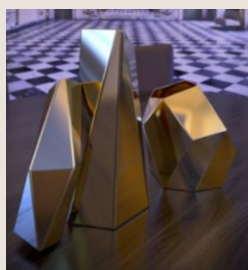
York's help – came up with a totally new vision for the property, bringing a beautiful, contemporary new design to life through a series of still CGI interior shots and a one-minute animation featuring the most interesting focal points.

Showing off every last detail of the new interior in all its glory required many complex CG renders, so high performing 3D software was essential. A 3ds Max-based studio, Atelier York opted to team up with Render Legion, creators of high performance 3D rendering software Corona Renderer.

"Corona's interactive rendering integration with 3ds Max is superb – solid, reliable, and snappy," says Atelier York director Alex York. "We've been asked how we achieved the very bright, clean, white look. This is almost entirely down to the design itself and the fact that Corona handles light beautifully.

"We chose Corona over other options primarily because it offered us the best possible results with the minimum of fuss," Alex continues. "Corona is fully geared-up for artists and studios who like to work photographically and artistically

Corona Renderer allowed the Atelier team to work like photographers and spend time finding interesting viewports and improving models and materials



In short, Corona has simplified our workflow greatly and made our work more enjoyable than it's been in years



## FEATURE

Creating realistic interiors

Corona is fully geared  
up for artists and  
studios who like to  
work photographically  
and artistically

### CORONA RENDERER

Corona Renderer is high-quality, photorealistic, easy-to-use 3D rendering software that allows 3D artists, animators, designers, and architects to visualise their designs in the form of photorealistic images and animations. The company's intentions are reflected in the software: free of superfluous buttons thanks to algorithms designed to do the hard work for the user. Corona Renderer aims to help users focus on what is really important – their creativity – instead of wasting time and energy on finding the correct values and settings for the technology being used to create it.

Atelier York were tasked with refurbishing Seaford Court to a very high specification and creating a totally new vision for the property



rather than technically, so we could focus on making beautiful and engaging content, rather than worrying too much about sample settings or dealing with rendering artifacts."

### Racing through renders

Alex and the team also found Corona Renderer to be a pleasure to work with at what is usually a dreaded and frustrating time of a complex CG project. "Render times were, as always, a challenge, but the results were even better than we'd hoped for and well worth the additional time and cost required over alternative options," Alex says. "The quality of light, especially of sunlight through trees, is particularly nice in Corona."

To ease any pain of rendering times they encountered, Alex and the Atelier team put their heads together and Corona Renderer's features to best use. "Everyone has a few tricks up their sleeve for dealing with render times, and we're no exception," he explains. "We found that rendering some shots that contained no natural, real-time movement of light or objects could be

rendered with half as many frames and then time-stretched in post-production. We couldn't even tell the difference between the 'proper' shots and the stretched ones ourselves, in the end, and it quite literally halved our render times and rendering costs."

While depth of field (DOF) was handled entirely in post using ZDepth passes and Lenscare, Corona Renderer also played a big part. "Corona's native DOF is very nice indeed and worthwhile in many situations," Alex comments. "We used DOF in-render for all the stills. Corona's render elements, particularly render masks, are very easy to set up and the fact that you can get masks out with DOF in just a few seconds is fantastic. A huge time saver."

### Hooked on Corona

However the team also needed to find a few workarounds to bring Seaford Court's new look to life. "Corona is not without its issues, and we did encounter some others during this production," says Alex. "The main issues we face on most projects are two rendering problems; the first is sunlight through solid glass hitting glossy reflective surfaces, resulting in areas of dark shading. The second issue is a shading artifact from Corona Sun along certain surfaces, particularly cushions and sofas, etc. Render Legion is fully aware of these issues and we very much hope a solution to both will arrive soon."

That said, it's clear the pros of Corona Renderer completely outshone the cons for the Atelier team during the creation of Seaford Court. "This was our first commercial project using Corona, and it certainly won't be the last," Alex enthuses. "In fact, we have moved our whole pipeline over to Corona fully since this project, including converting our whole asset library, and have used it on many projects since."

"We would normally consider ourselves to be fairly renderer agnostic, but, after 10 or so years of working like technicians, Corona has allowed us to work like photographers. Instead of spending our time fiddling with sample settings and battling against other rendering issues, we could spend that same time finding interesting viewpoints and improving our models and materials using IR, with great results requiring almost no post-production.







## ILLUMINATING LIGHTING

One of the most common questions Alex York and the Atelier team get asked about this project is how they achieved such a bright, white interior for Seaford Court. Corona Renderer being able to handle light beautifully was a major factor, but the team also developed some techniques and workarounds to fully achieve the look they were after.

"As with all our projects, we work as closely to reality as possible, so all lights have proper light sources, modelled in 3D, with accurate Corona lights, using real-world Kelvin temperatures and power," York explains. "This gives us the best possible quality of light and predictable results. When you know your lights are correct, you can adjust exposure to balance the scene with minimum fuss," he continues.

"One thing we did do to help achieve the bright white finish was keeping the exposure level relatively high and using Contrast to bring the blacks back down and to maintain a decent amount of contrast and detail," Alex reveals. "This was all handled in the CoronaCameraMod. Be aware, though, that as soon as you use anything greater than 1.0 for Contrast it will remove any ability to re-expose your EXR frames in post-production. If you need this control, for some reason, leave it at 1.0 and render to 32-bit EXR. Ideally, though, you will get your exposure correct straight out of the box and you can then adjust the Contrast as needed without having to worry."

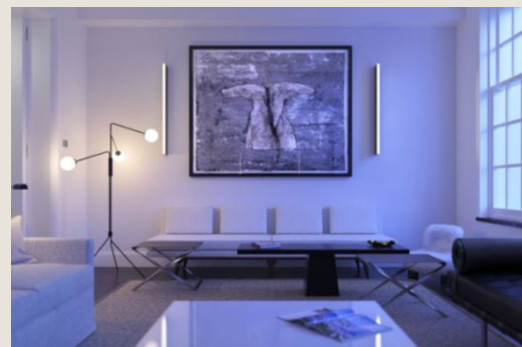
We were getting beautiful, clean results almost immediately even with placeholder objects and materials during the early phase of the project."

"In short, Corona has simplified our workflow greatly and made our work more enjoyable than it's been in years. The competition is changing, however, and is now very close to Corona in terms of simplification of workflow. But for us, the way Corona actually handles materials and light, and its very robust IR system, are enough to keep us here at the moment and that's unlikely to change for some time. We're very excited to see where Corona goes in the coming months and years."

Atelier York will also be adopting a Corona pipeline on an upcoming new venture. "We are about to launch our new joint venture Recent Spaces, with Iain Banks, a very well-known and respected name in the arch-viz world, and we'll happily continue using Corona," Alex reveals. "We're very excited to be able to publish more news about this very soon. For now, keep an eye on [recentspaces.com](http://recentspaces.com)."

**FYI** For more on Atelier York, go to [www.atelieryork.co.uk](http://www.atelieryork.co.uk)

Coroner Renderer helped achieve the bright, white interior at Seaford Court, which was the look the team were striving for





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**FREE DOWNLOADS  
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## GET YOUR RESOURCES

You're three steps away from this issue's video training and files...

### 1. GO TO THE WEBSITE

Type this into your browser's address bar:  
[www.creativebloq.com/vault/3dw207](http://www.creativebloq.com/vault/3dw207)

### 2. FIND THE FILES YOU WANT

Search the list of free resources to find the video and files you want.

### 3. DOWNLOAD WHAT YOU NEED

Click the Download buttons and your files will save to your PC or Mac.





If you see the Play icon,  
use the link!



## ARTIST PROFILE

**Bhaumik Patel**

Former Escape Studios tutor  
Bhaumik has created Amaya Academy, which offers a 30+ hour online course in Maya for visual effects and animation to get you from beginner to professional level.  
[amayaacademy.com](http://amayaacademy.com)



 MAYA | NUKE | MENTAL RAY

# MASTER PHOTOREALISTIC CAR RENDERING

*Bhaumik Patel* shows how to use Maya 2016 to create a photorealistic car render using the latest features of mental ray

## TOPICS COVERED

Rendering  
Lighting  
Shaders  
Texturing

In this tutorial we will look at what it takes to create a photorealistic car render inside Maya 2016. We will start off by downloading a free car model from Turbosquid. The principles you will learn here can be applied to your own model if you wish. We will then download a HDR image to use as the background and lighting from [www.hdrilabs.com](http://www.hdrilabs.com) and set up a nice camera angle for our car.

We'll then move onto shaders, using the Mila mental ray shaders, and complete the render in Nuke by applying finishing touches.

Maya 2016 has had a significant update to the interface. If you have used mental ray before you will notice the tabs in the Render Settings window have completely changed and features have been moved around. This is to simplify the render set up using the modern workflow of having physically plausible shaders, with a global and predictable way to control the quality and render time.

The new workflow is to leave the samples on the lights and materials relatively low. You can then increase

them on a global basis using three sliders in the Render Settings>Quality>Sampling section. You must use Mila shaders on your lights and materials for these sliders to work.

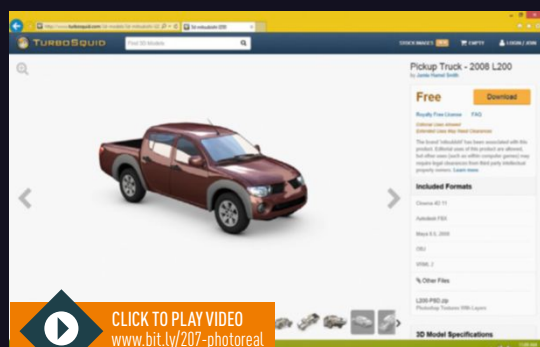
Unified sampling is the latest sampling method. It will use samples more efficiently where they are needed, giving you a better image with lower render times. This works especially well when you have lots of glossy materials with area lights.

 For all the assets you need go to [creativeblog.com/vault/3dw207](http://creativeblog.com/vault/3dw207)



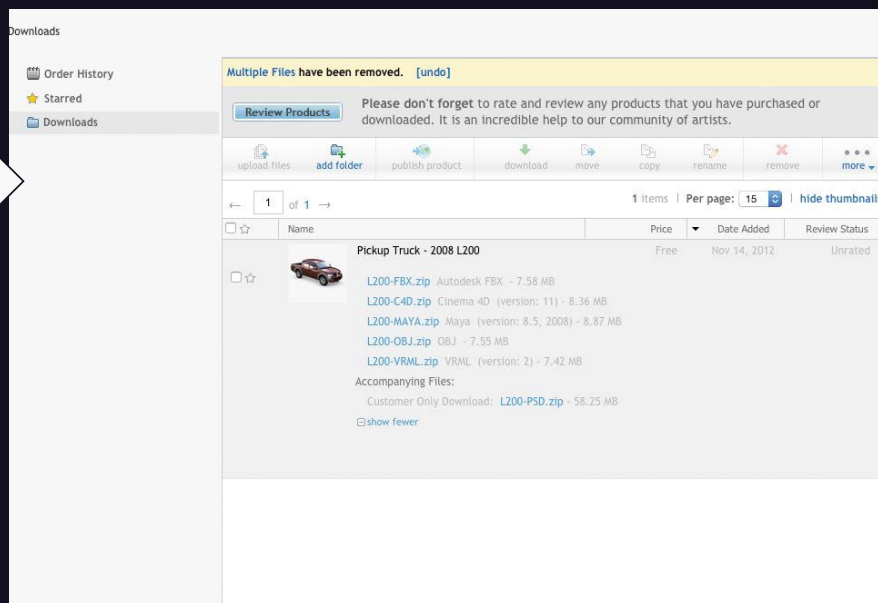
## IMPROVED RESULTS

The new workflow in mental ray produces a better image and with lower render times



### 1 DOWNLOAD CAR MODEL

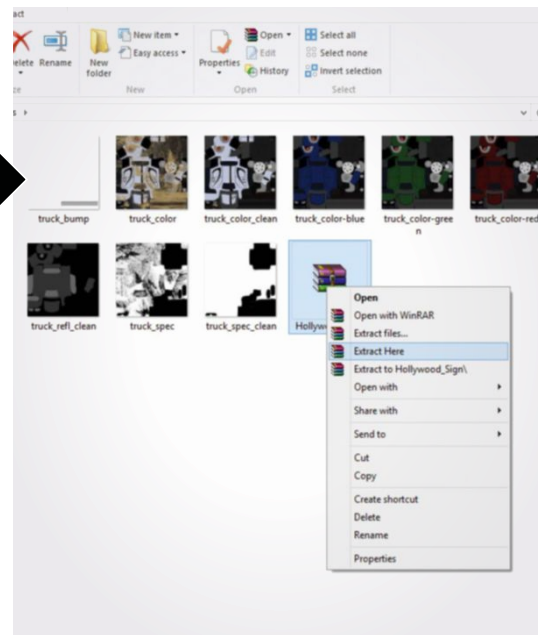
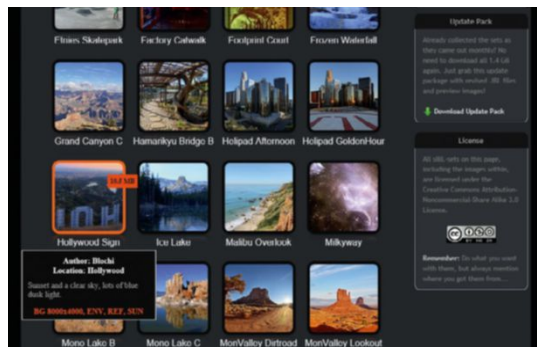
Search for L200 on [www.turbosquid.com](http://www.turbosquid.com) and click on the free model which will be on the bottom of the list. Click on the orange download button, if you are not already a member you will need to sign up with an email address, member name and password. We need to download the L200-MAYA.zip file. Unzip your file where you want to create this project. It is a Maya project folder called L200-MAYA.





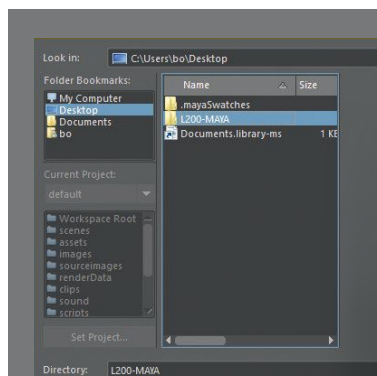
## TUTORIALS

### Photorealistic car rendering



## 2 DOWNLOAD THE HDRI

Let's download the HDRI from [www.hdrlabs.com](http://www.hdrlabs.com). Go to the Smart IBL page then click on the sIBL Archive link in the middle on the left. This is a great resource for HDRI maps and also maps of lights. Scroll down to Hollywood sign and click on it to download. Move the Hollywood\_sign.zip file to your Maya Project>sourceimages folder and unzip it.

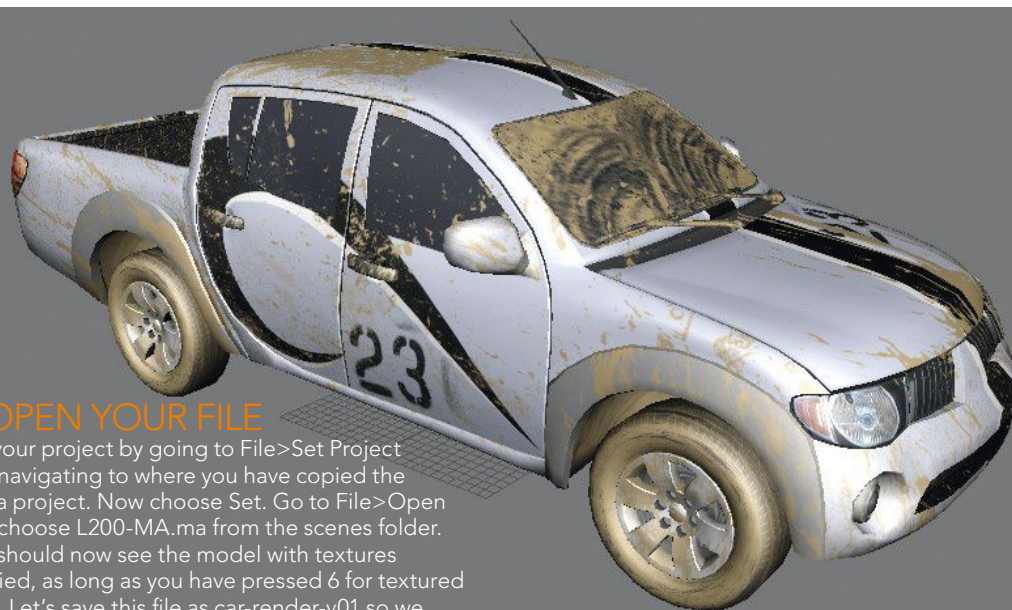


### TEXTURE FILES

It's important to set your project so Maya can find the texture files. The default place it will look is in the source images folder

## 3 OPEN YOUR FILE

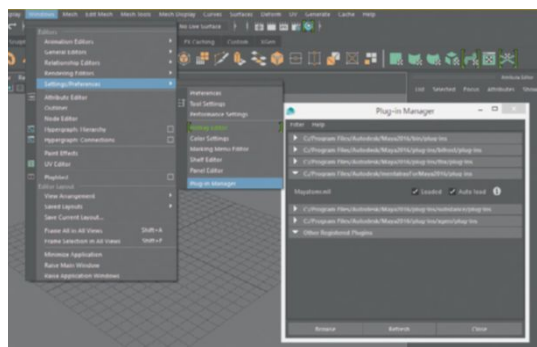
Set your project by going to File>Set Project and navigating to where you have copied the Maya project. Now choose Set. Go to File>Open and choose L200-MA.ma from the scenes folder. You should now see the model with textures applied, as long as you have pressed 6 for textured view. Let's save this file as car-render-v01 so we don't overwrite the original model. Go to File>Save as car-render-v01.



### EXPERT TIP

#### MR Production Shaders

Mental ray production shaders are hidden by default. You can expose them by typing in: optionVar –iv "MIP\_SHD\_EXPOSE" 1; restart Maya for them to appear in the Hypershade.



## 4 LOAD MENTAL RAY

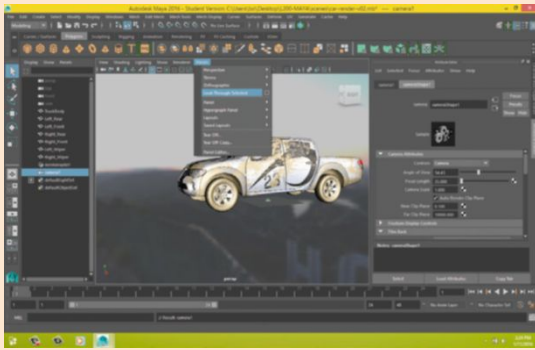
Mental ray no longer comes installed with the standard Maya installer. Before starting this tutorial be sure that the mental ray for Maya plug-in is loaded from the Windows>Settings/Preferences>Plug-in Manager>mayatomr.bundle tick box. If you do not see it there you need to download it from the Autodesk website. A quick google search for 'mental ray for Maya 2016' will get you to the download link.



## 5 SET UP AN IBL

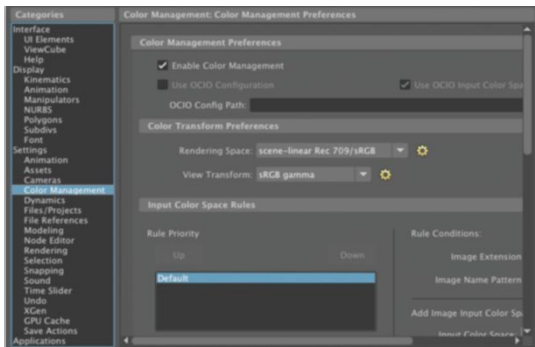
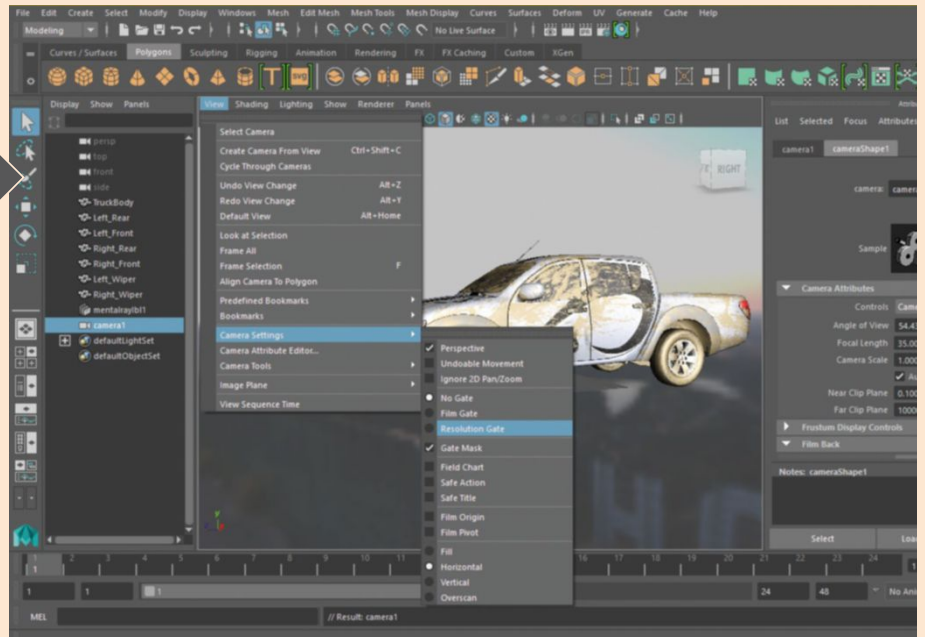
Let's create an image based light (IBL). Go to Create>Lights>Environment Image (IBL), this will create an IBL. In the Attribute Editor click on the folder next to the image name attribute; this will open in sourceimage. Navigate to the Hollywood\_Sign folder and pick HWSign3-Fence\_2k.hdr. You should now see the IBL with our HDRI texture mapped to it. Note that the Emit Light tick box has already been enabled.





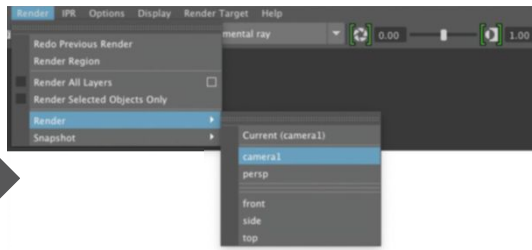
## 6 SET UP YOUR CAMERA

Go to Create>Cameras>Camera, then Panels>Look Through Selected to load the camera view in one of the viewport panels. Move the camera to a side view (as shown above) using your regular viewing controls. You can turn on your Resolution Gate to see what will be rendered. In a panel go to View>Camera Settings>Resolution Gate and change the resolution to a 16:9 aspect ratio in Render Settings>Common>Image Size change the preset to HD 720.



## 7 CONFIGURE MENTAL RAY

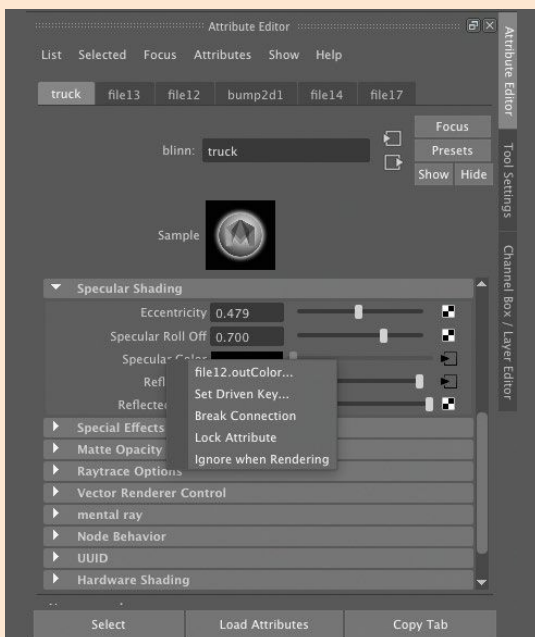
Let's turn on Color Management to get correct looking lighting. Go to Window>Settings and Preferences. In the Color Management section turn on Enable Color Management. Open the Windows>Rendering Editor>Renderview and change your current renderer from Software to mental ray using the dropdown menu. Render your current view: in the Renderview go to Render>Render>Camera1. This render looks too bright and the texture makes it difficult to see the lighting.



## MENTAL RAY IBL NODE

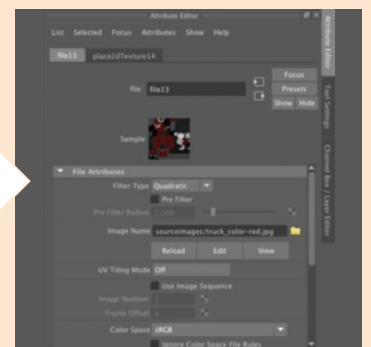
### Emit Light Tick Box

This will create a giant area light around your scene, which importantly samples your HDRI image, giving great renders with little tuning. Use the quality slider in the Shape node or in the render setting to control the graininess of your render. With most dome lights I suggest painting out the main key light sources in Photoshop or Nuke and using Mila lights to replace them. This gives more flexibility to change your lighting. I often cut the light out of the HDRI and save it as a separate HDR image. You can then map your light's colour with this map for accuracy. It's great for interior scenes where objects are moving through pools of light.



## 8 ADJUST YOUR TEXTURES

Select any part of the car by clicking on it and then in the Attribute Editor go the Shader tab which will be called Truck. Click on the little black triangle next to the Color slot and you will see the File node. Replace the texture by clicking on the folder icon and choosing truck\_color-red.jpg. Next go back to the Truck shader and disconnect Specular Color and Reflectivity by right clicking on the name and choosing Break Connection.

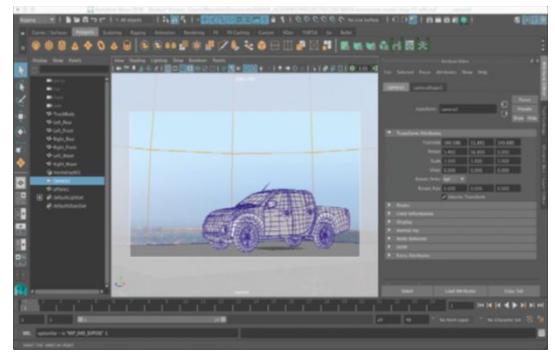






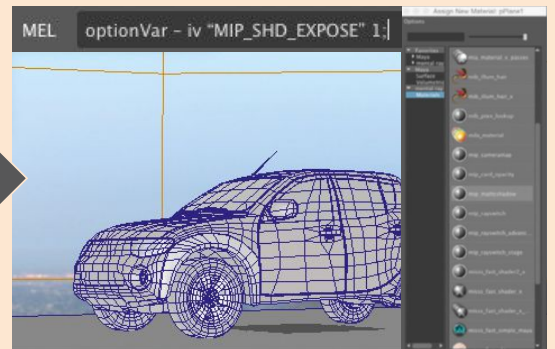
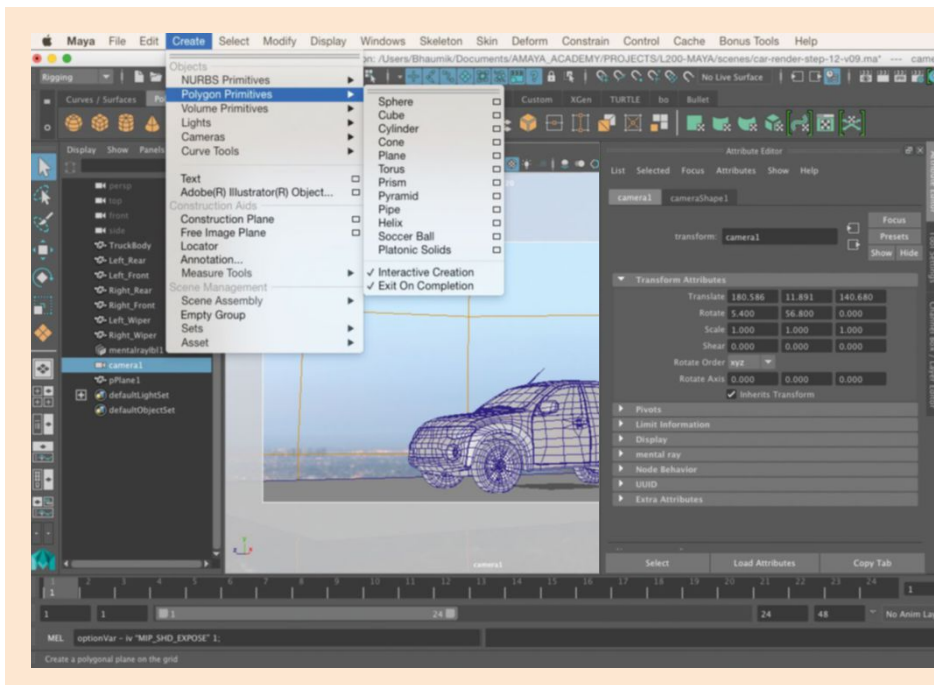
## 9 CHANGE THE LIGHTING

Rotate your IBL node; you can find it in the outliner. Let's set the rotate Y to 98. You can't see the colour very well because the reflectivity is high. Let's move the IBL by setting translate y to 4.5 in the attributes of your IBL. Turn off Infinite otherwise the translation is ignored. This should position the sun in front of the car and give us more dramatic lighting. Render and have a look.



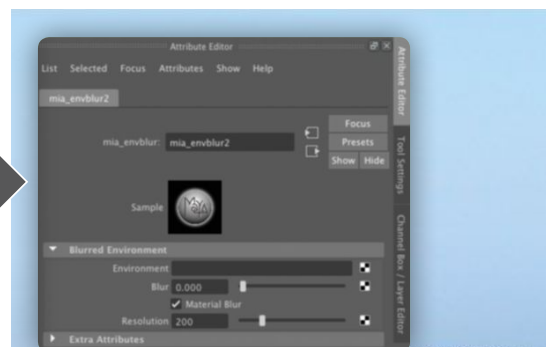
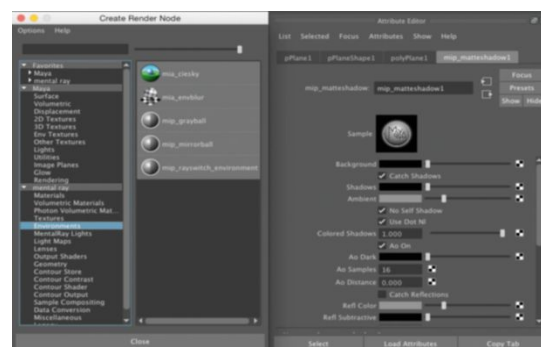
## 10 ADJUST THE CAMERA

Let's adjust the camera1 to a focal length of 60, so the car is flatter in the frame. This will make it look more like a zoom lens. Now adjust your camera position so the camera matches the screenshot above. Try and get the wheels in line and the car to be on the green part of the image so it looks like it's on the ground. My camera position is X:180, Y:12, Z:140, and rotation X:5.4, Y:56.8 and Z:0. Now render.



## 11 CREATE THE GROUND

Create a plane from the Create>Polygon Primitives>Plane menu and scale to a size to catch the shadows from the car. Use the mip\_matteshadow shader, as the regular useBackground shader won't catch shadows. In the command line type optionVar -iv "MIP\_SHD\_EXPOSE" 1; to expose hidden shaders. Save the scene and restart Maya. Right-click on your ground plane and choose Assign New Material. Go to Mental Ray>Materials and choose mip\_matteshadow. Now render.

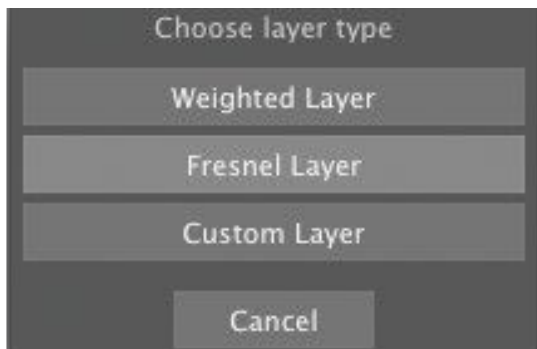


## 12 GROUND SHADER

The ground shader is working but it's blocking the background from being seen. Select the ground plane and go to the mip\_matteshadow tab and map the background slot by clicking on the checker and choosing mental ray>Environments>mia\_envblur. This will look up the background, so now when you render you should see a nice shadow on the ground. You can make your shadows light or coloured to match photos here. We will leave it on default values.

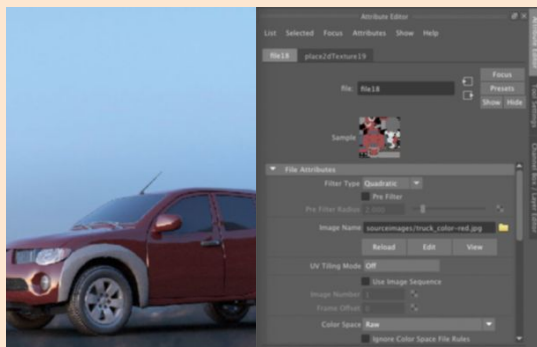
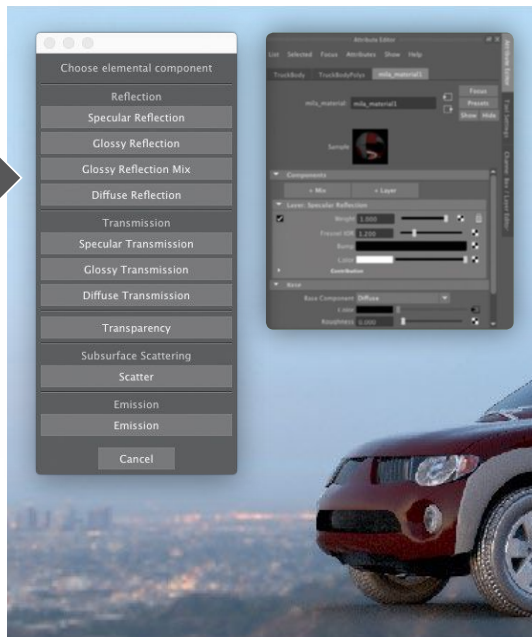






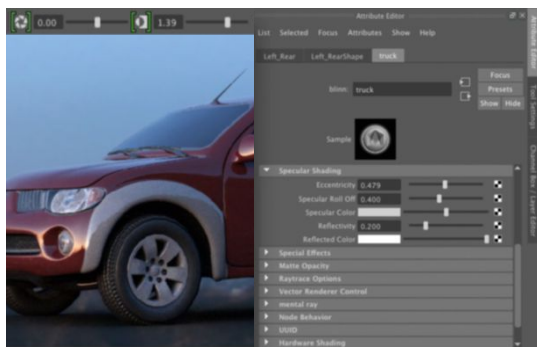
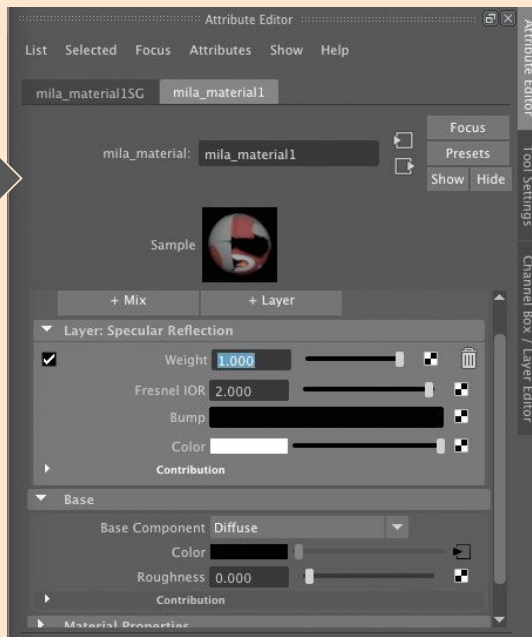
## 13 BODY MATERIAL

Right-click on TruckBody object and choose Assign New Material. Choose a mila\_material from the mental ray>Materials section. Map the Color Attribute with a File node by clicking on the Checker button inline with the Color Attribute. In the File node image name attribute pick the truck\_color-red.jpg. Now add the reflection layer by clicking on the +Layer button in the Mila material. Choose Fresnel Layer and choose Specular Reflection from the top. Now render.



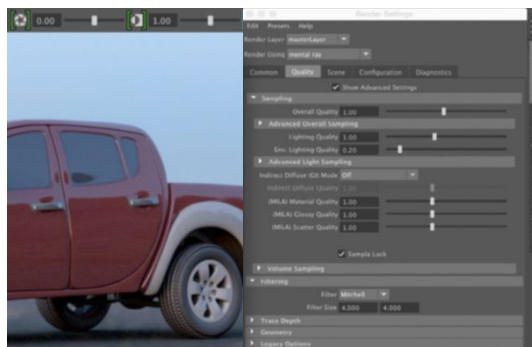
## 14 ADJUST MATERIAL

We now have more reflections on grazing angles so let's turn down the effect so we have more reflections. So change the Fresnel IOR to 2. Let's make the red brighter. Click on the little black triangle next to the Color attribute you mapped earlier. In the File node change the file colorspace attribute from sRGB to Raw. This will stop Maya from applying a gamma correction so it should look brighter. Now render.



## 15 WHEEL MATERIAL

Let's adjust the wheel highlights. Select a wheel and go to the truck shader. In the Specular Shading section change the Specular Roll to 0.4 and Reflectivity to 0.1. Now smooth the TruckBody and wheel objects by selecting them and pressing [3]. Now render.

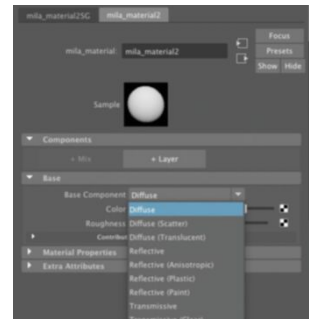


## 16 RENDER SETTINGS

Set your Render Settings to Final Quality. In the Quality tab change Overall Quality to 1. Scroll down and set Filtering to Mitchell rather than Box from the drop-down menu. In the Common tab change your file name to prefix=car-renderv01. Set the Renderable Camera to camera1. Go to the Rendering menu and choose Render>Batch Render. The file will render and you can see the progress at the command line on the bottom of the screen.

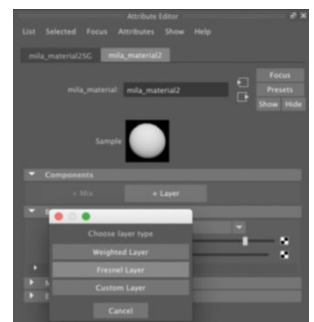


## TRUCK SHADER ONLY ADD ESSENTIAL COMPONENTS



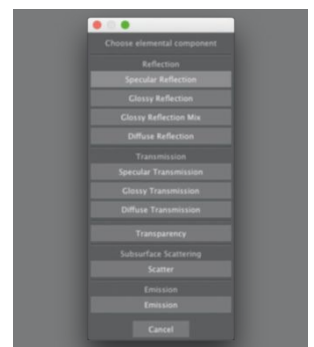
### ONE CHOOSE BASE COMPONENT

From the the drop-down menu you have many choices for your base shading component. We will stick to diffuse and map truck\_color-red.jpg to the Color slot.



### TWO ADD LAYER

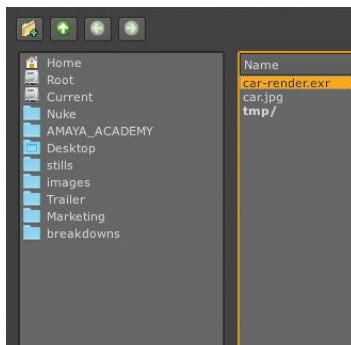
Click on the +Layer button to add a component. You can choose how it it mixed. Custom gives the most flexibility but we choose Fresnel Layer as we are creating reflections.



### THREE ADDING YOUR ELEMENTAL COMPONENT

Now you can choose what type of layer you want. We will choose Specular Reflection for a sharp reflection. Choose Glossy reflections for objects like a tire.





## EXPERT TIP

### Larger colour picker

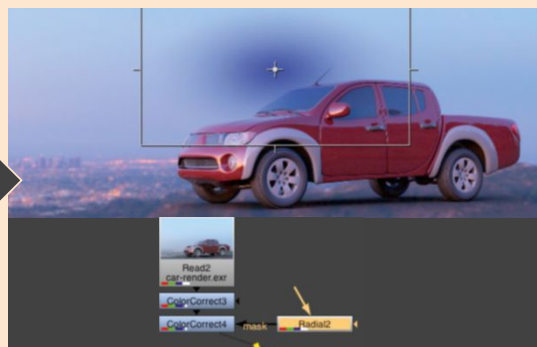
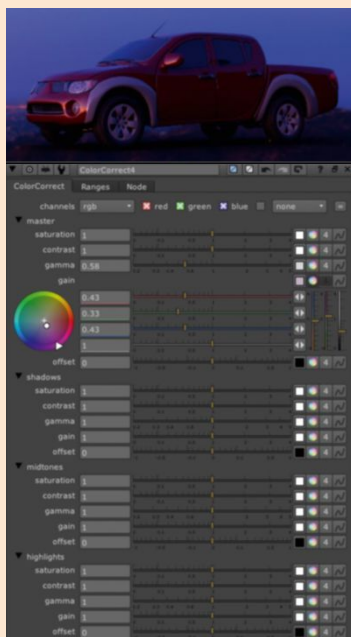
In Nuke you can use a floating Color Picker with more options and control by [Ctrl]-left click [Cmd]-left click on the little colour wheel icon.

## 17 IMPORT IMAGES

Start up Nuke. With your cursor in the Node Graph press [R]. This will bring up a window so you can browse to a file to read in. Navigate to your Maya project>Images Directory and choose car-render-v01.exr. To load it into the viewer click on the Read node and press 1. To fit to the viewer put your cursor inside the viewer and press [H].

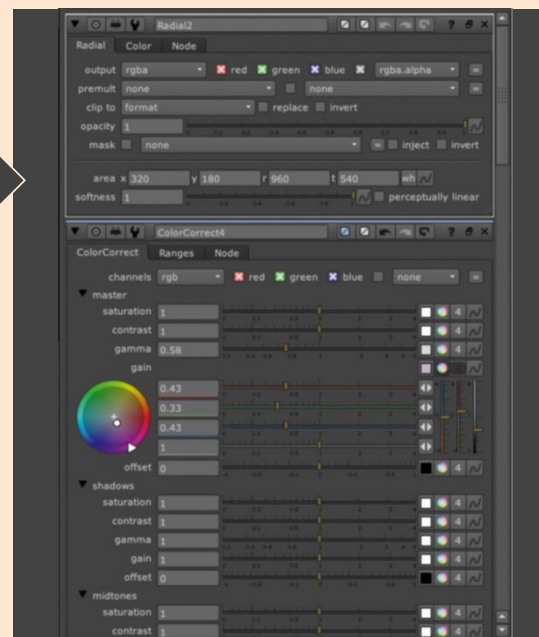
## 18 APPLY COLOUR CORRECTION

Select the File node and press [C]. Be sure your cursor is in the Node Graph. This will create a Color Correction node. You can adjust gain by clicking on the little colour wheel next to Gain. I will tint it slightly pink to complement the car colour and background sky. Set Gain red to 1.1 green to 0.8 blue to 1.1. Let's also add some colour by setting Saturation to 1.4. Let's bring up the midtones so they are brighter by setting Midtone Gain to 1.3.



## 19 CREATE A VIGNETTE

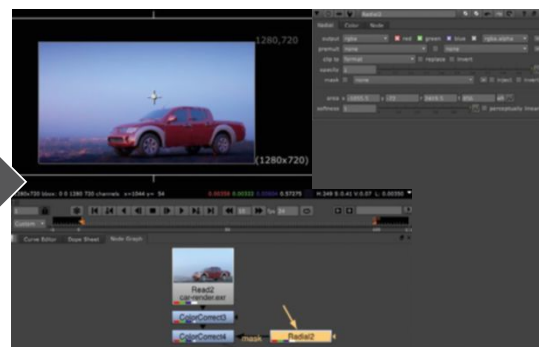
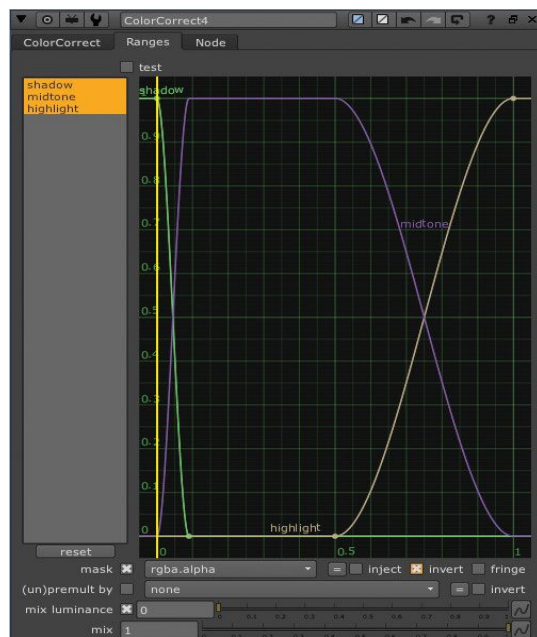
A vignette will darken the edges of our image. Select the Color Correction node you created already and press [C] again to create another one. Let's darken the image by setting the gamma to 0.57 and Gain to  $r=0.43$   $g=0.33$   $b=0.43$ . Let's mask the effect by creating a Radial node. Click in an empty area to deselect and right-click>Draw>Radial. Connect this up by clicking and dragging the little triangle on the right of the Color Correction node to the Radial node.



## EXPERT TIP

### Disable and compare

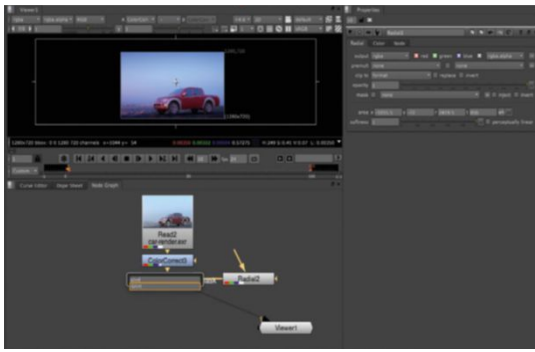
Select a node in Nuke and hit D to disable it. You can hit D again to turn it back on. In this way you can compare before and after!



## 20 ADJUST THE VIGNETTE

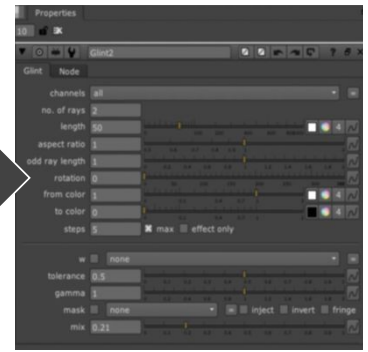
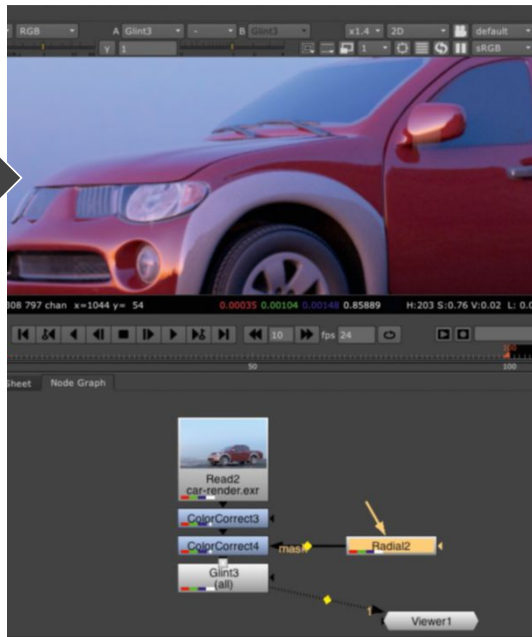
Let's move the radial controls. In the viewport click and drag on the cross so that it's in the middle of the screen. Now you can see it's making the inside of the image darker. We need the opposite so double click on the second Color Correction node and go to the Ranges tab. At the bottom, in the same line where it says mask, click on Invert. The edges should now be dark. Adjust the shape of your vignette by dragging the lines outside of the image to have a more subtle effect.





## 21 ADD GLINTS

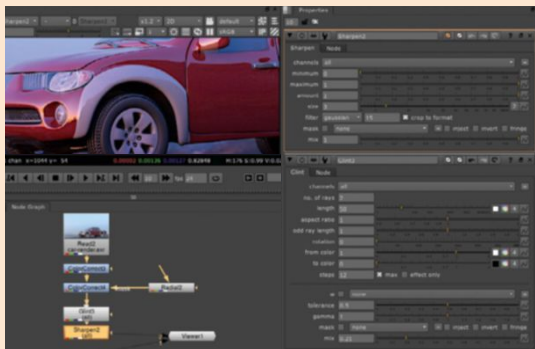
When you are happy, select the last colour correction and press Tab, then type in 'glint' and press Return. This will create a highlight on the brightest part of the image. Let's mix it back so it's subtle; so set mix to .21. Next create a new glint and set rays to 4, length to 175, steps to 15 (to smooth the highlight), and threshold to .79 to only affect the mirror highlight.



### EXPERT TIP

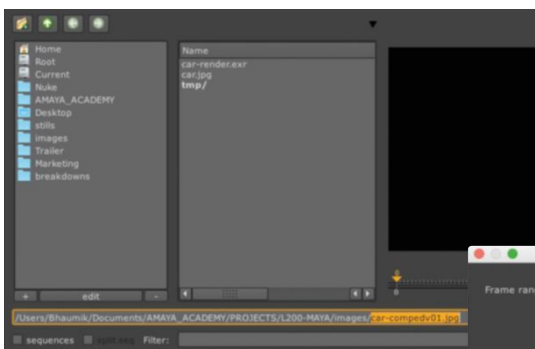
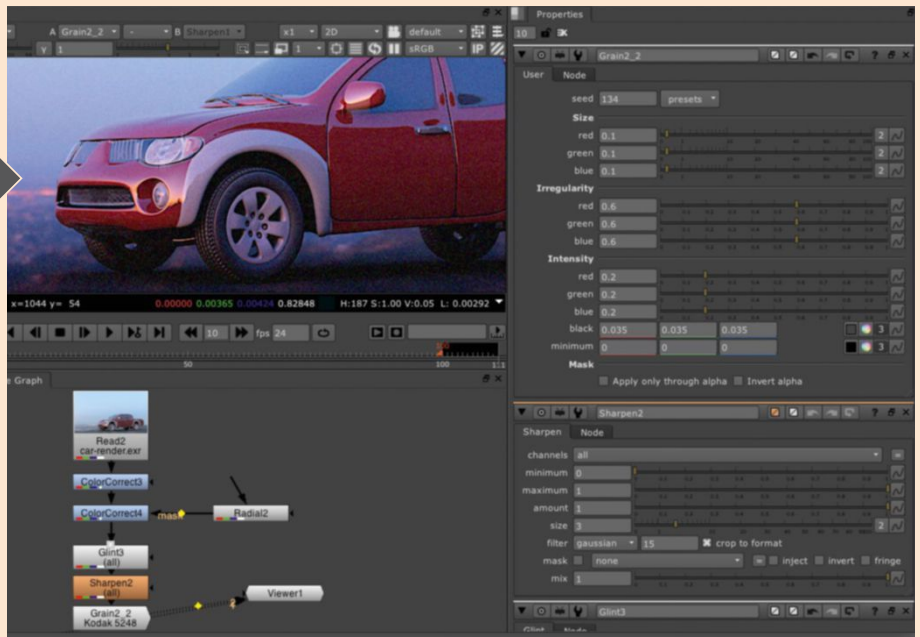
#### Smoothing options

To control how many times an object is smoothed when using the [3] key, go to the Shape node of the object then the Smooth Mesh> Subdivision Levels section.



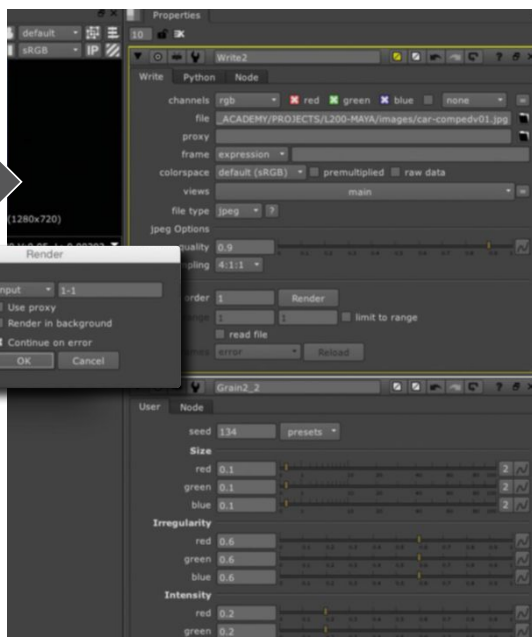
## 22 ADD EFFECTS

Add a sharpen effect by selecting the last Glint node, pressing Tab, typing in sharpen and then pressing the Return key. Let's add film grain by selecting the Sharpen node and creating it in the same way as above. Change black levels on the RGB to 0.035 and change the size to 0.1. Lower intensity down to 0.2 on RGB. Turn off Apply Through Alpha.



## 23 OUTPUT IMAGE

Select the Grain node and press [W] to create a Write node. In the file section, click on the black folder icon and choose where you want to save your image in the browser. Type in the name you want followed by the extension at the bottom of the browser. I would choose jpg for easy sharing or tiff for lossless quality. Press the Render button on the Write node and choose OK in the render options. ■



## MENTAL RAY PASSES

### Output your render passes

If you have used mental ray before, you may be wondering where the render passes have gone! If you are using a Mila material workflow, which is recommended, then you can go to the Scene tab in Render Settings and tick the passes that you want. If you are using a mixture of materials, the passes will still work but only for the Mila materials. You can access the legacy passes by right clicking on a render layer then selecting Add New Renderpass and picking a pass.





# HOW TO MASTER DESTRUCTION SIMULATION

Learn the core techniques to dynamically and realistically destroy a building for a VFX project, with **Hashem Alshaer**

**BREAKING BAD**  
Use the power of RealFlow's simulation tools to create explosive destruction scenes



## ARTIST PROFILE Hashem Alshaer

Hashem is a VFX supervisor at 3Q.ae and a partner and instructor at cmiVFX. He has more than 14 years of experience working as VFX/CG supervisor, and creatures, tracking and effects TD.

[www.cmiVFX.com](http://www.cmiVFX.com)

## TOPICS COVERED

Setting up  
Particle control  
Simulation

Over the course of this tutorial, we will explore a part of the cmiVFX course, The Church Destruction Tactics, at [www.cmiVFX.com](http://www.cmiVFX.com). You can watch the first part here: [www.bit.ly/cmiVFX-part1](http://www.bit.ly/cmiVFX-part1). We will be working on a high-end VFX scene, using several techniques to apply art-directed effects on a heavy film-quality destruction scenario of a church, with RealFlow 2015, as well as a variety of tools such as FumeFX, Particle Flow particles and 3ds Max.

We will demonstrate RealFlow's strong rigid and soft bodies sim tools, and its multijoint control system, to create high-detailed explosion and destruction scenes. We'll also generate smoke, debris, dust and impact effects. RealFlow 2015 is a unique

complete dynamics software, it's known for its powerful liquids simulation tools, but it has one of the best rigid, soft and elastic simulation environments too, and its stability, simplicity and solvers interactivity between each other, make it the best choice when it comes to simulating destruction scenes – as you will see in this tutorial.

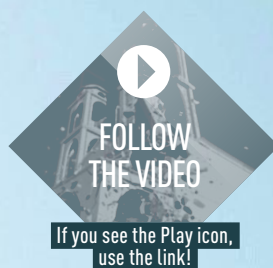
The whole course at cmiVFX includes a complete model of the church, and other soft body and particles simulation in RealFlow, but here we'll be using a section of the model (which is enough for you to master these skills), and we've included more than two hours of high-quality video especially made for 3D world. I'll begin by sharing how to set up a scene in RealFlow; set up

the already fractured Church (the part which we will be working on in this tutorial) inside RealFlow, by grouping its parts, setting up pieces' properties, and establishing the right connections between them, as well as other simulation details.

You can download all of the work files, videos and set-up files that accompany this training from this issue's online Vault. Throughout the tutorial I'll be referencing using these, so have them to hand. Special thanks to 3Quarter.ae, Artware Corp, cmiVFX, Fadi Wahbeh and Chris Maynard for the support and the materials used in this course; I hope you find it as much fun to follow as I did to create!

For all the assets you need go to [creativebloq.com/vault/3dw207](http://creativebloq.com/vault/3dw207)





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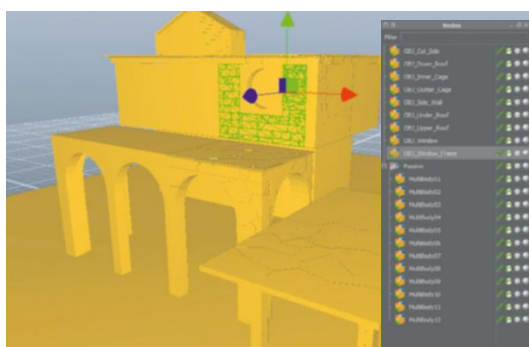
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## 1 SET UP THE SCENE

Open an empty scene in RealFlow and create a new project. Call it Church base then import the fractured church objects one by one from the Article Project Files>RealFlow>Objects From 3D folder. Import these as multibodies by right-clicking on the nodes and selecting Dope>Add>Obj>Multibody or import them all by using Import>Multibodies from folder. Also check the Preferences for correct axis and other simulating settings, FPS and steps.



## 2 RENAME THE OBJECTS

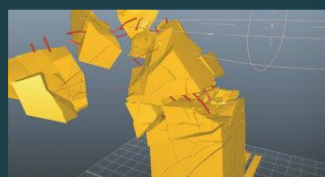
Start renaming the objects and define their nature. Some of those will be passive objects and some will be rigid body objects. You can define this by going Node params>Node>Dynamics. Also, try to put all the passive objects in one group, name it a passive group. The multibody object is a group made up of fractured objects itself and by encapsulating them together you can change their properties to make them easier to deal with later when simulating.

## EXPERT TIP

*Use scripts to automate*

To get the best results from RealFlow it's always better to work with Python and/or Graph Editor to automate tasks and modify some existing tools. It's not as hard as you may have heard, especially with Graph Editor, where not a single line of code is needed.

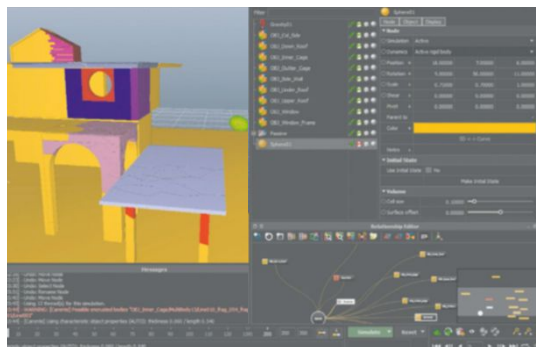




## COMPLEX SCENARIOS

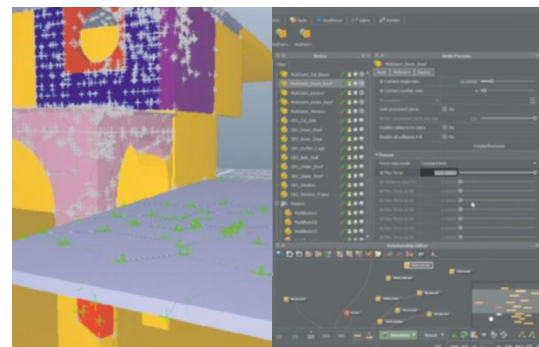
### Mixing rigid and soft bodies

When working with multibodies and multijoints tools inside RealFlow, far more complicated scenarios can be created by having rigid and soft bodies along on the same setup. In RealFlow, most of the solvers can interact with each other, so, for example, if the scene requires having iron rods within a cement structure, we can do that by applying soft body property on the iron rods and rigid body for the cement itself then connecting everything using several multijoints nodes in one structure. This means we can model the cement and the rods, and pre-fracture them inside 3D software, keeping a certain gap between them so they can collide later, and in RealFlow we can have multijoints for, cement-cement, rods-rods, and cement-rods after determining their nature (rigid or soft body).



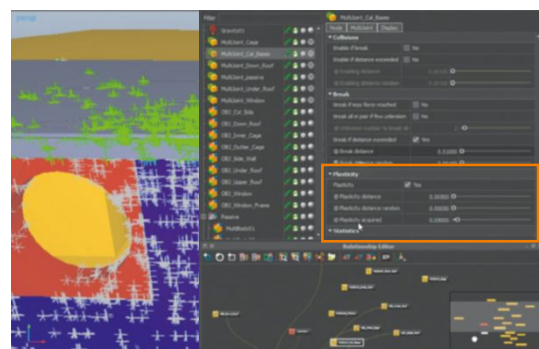
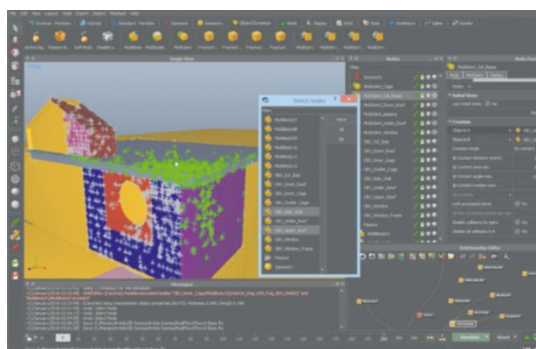
## 3 SET OBJECT PROPERTIES

Change your objects' properties by setting up their densities, friction and elasticities. Doing this will determine their behaviours when they collide with other objects, and remember that you will be dealing with various substances and materials, and each has its own values. Create a little moving sphere, which should hit the edge of the church section we are working on here. Make this a rigid body too and give it a suitable initial velocity from Rigid Body>Velocity.



## 4 CONTROL BREAK POINTS

To control objects' break points, collisions and strength – to have the full control over their collapse after getting the impact – you must establish a set of connections and joints between the fractured parts, as well as inside each multibody object. You can set up new multijoints by right-clicking on the nodes, and selecting Dope>Add>Obj>MultiJoint. Choose the objects you will need to join together, adding different settings for each node and connection.

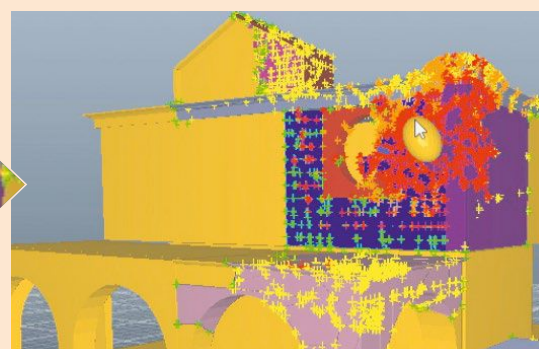
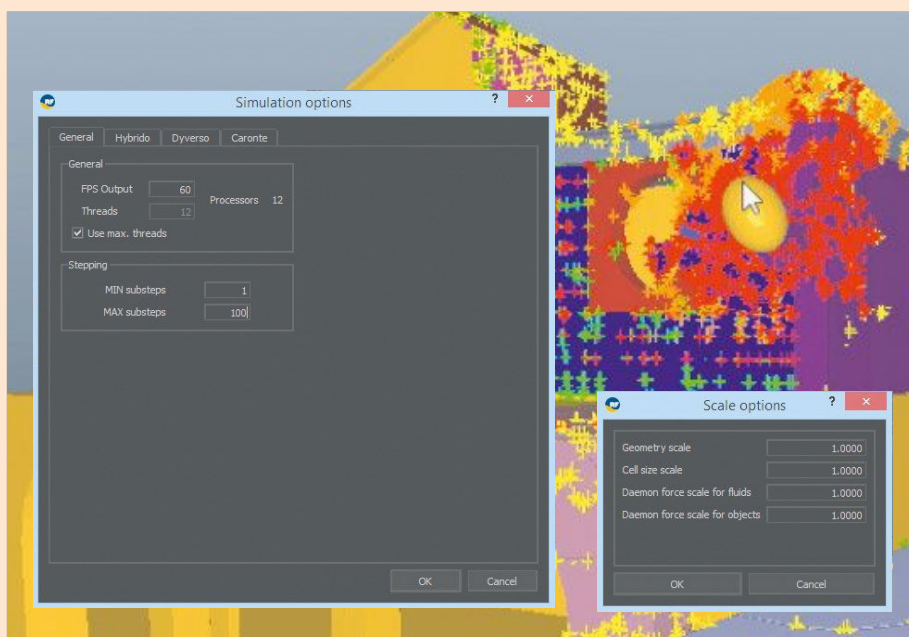


## 5 SET MULTIJOINTS

Select the objects you want to connect from Creation>A&B, and set the Contact Distance Search to include all the pieces you'll need to have joints in, change the contact's number to define the joint's number between each part. Define the Force mode to unlimited or constant from Forces to determine its solidity, and finally set the break distance value to make it breakable; if it exceeded this distance during the simulation.

## 6 USE PLASTICITY

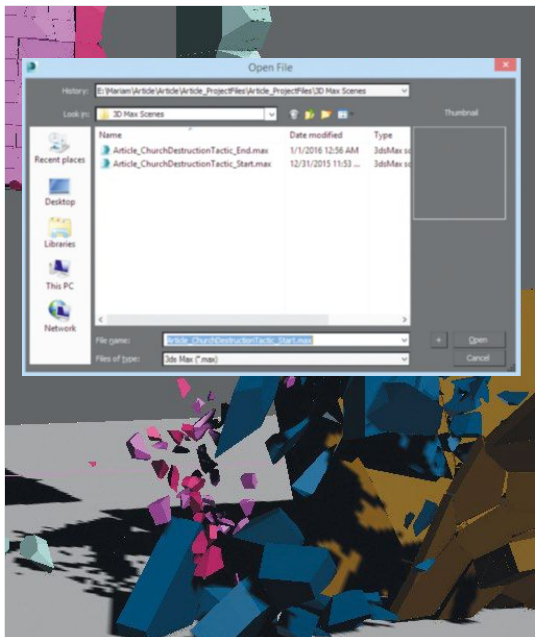
Plasticity is a special property in multijoint that enables displaced chunks (deformed joints links) to keep their deformation permanently or partly, which makes them look real. This is very useful when simulating, for example, the behaviour of iron rods which in reality should be there connecting these pieces. Don't forget that you can always create joints between a multibody and itself, by adding it to both A&B objects, along with other objects.



## 7 ADD A GRAVITY NODE

Add a gravity node by right-clicking on the node and selecting Dope>Add>Daemon/Gravity. Ensure that simulation options are set right: here, we increase the frames per second value to 60, to make a slower simulation – remember, the scene and imported object's scale is extremely important as it can change the simulation's final look, speed and even its stability. We work in real-world scale, but you can change the scene scale by going to Scale Options.





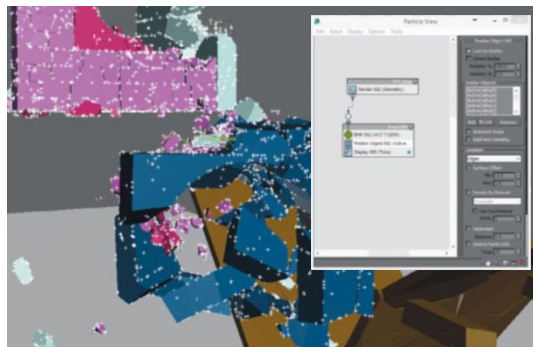
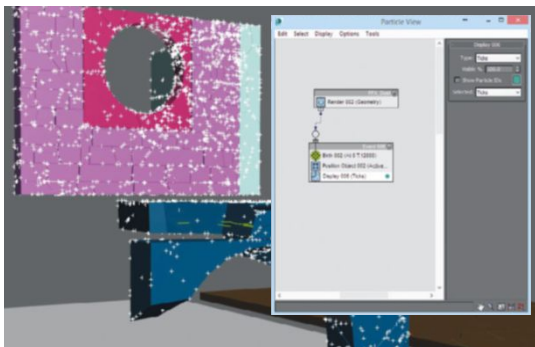
## EXPERT TIP

### Stay in control

Keep your object count under control and increase it in steps; it's advised to work with this logic even if you have the ability to get a massive amount of objects in one simulation.

## 8 IMPORT INTO 3DS MAX

Import the simulation Destroyed Church into 3ds Max, by importing the animation .sd file from the Object folder from the Church base RealFlow scene we set earlier. Make sure that its scale is suitable for FumeFX smoke setup, in this case, I scaled the animation .sd file 100 times to fit with FumeFX, but we will continue this tutorial by opening the file Article project files>3ds Max Scenes/Article\_ChurchDestructionTactic\_Start.max from the Vault.

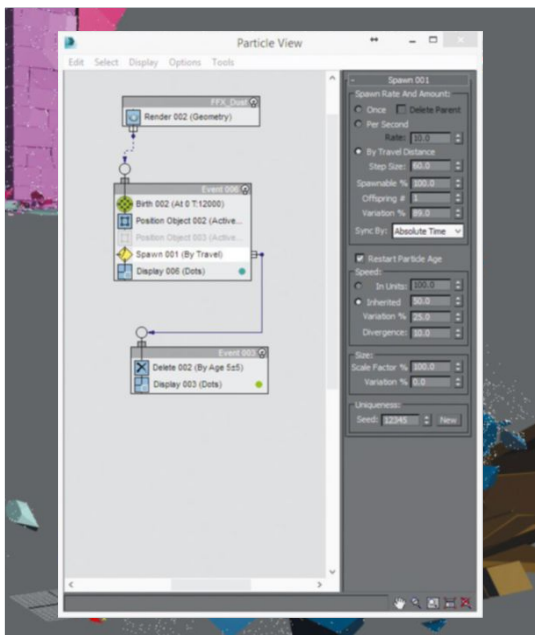


## 9 SET THE PARTICLE FLOW

Open the 3D file and from the Creation Menu go to Geometry>Roll Down/Particle Flow and create a Particle Flow (PF) anywhere in your scene. From the Modify Menu press Particle View, then create a PF by right-clicking; change the birth to start from 0 and the number of particles to 800. Now replace the position icon with position object to create the particles from every piece of the church. Pick the pieces from the list and lock the particles to them.

## 10 ADD DUST AND SMOKE

To simulate the dust and smoke later in FumeFX, we are going to create particles from each fallen piece and let the system emit particles when any of those pieces start falling or moving. When creating smoke, we need to tell FumeFX where, when and how fast it should be, this can be done by emitting smoke from each particle on each piece, and then we can control its properties later in FumeFX. Now your primary particle system is ready.



## 11 GENERATE PARTICLES

Next, add a Spawn node to generate particles from each particle when it moves. Set the mode to By Travel Distance; Steps to 60; Inheritance to 50, Variation to 25 and Divergence to 10, to make sure that they fall naturally, which will generate the smoke and lead it later. Add a Particle Age node, set the test value to 5 and the variation to 5, to kill the particles as we just need the church pieces' start-up positions and their initial velocity for Fume Smoke.

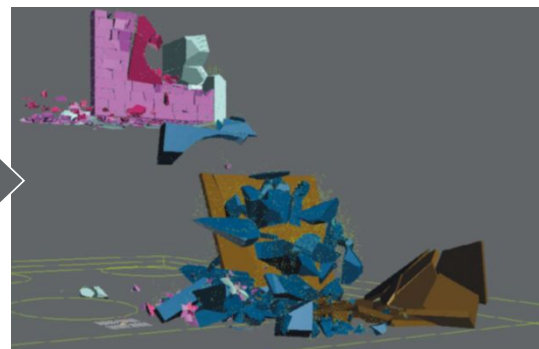
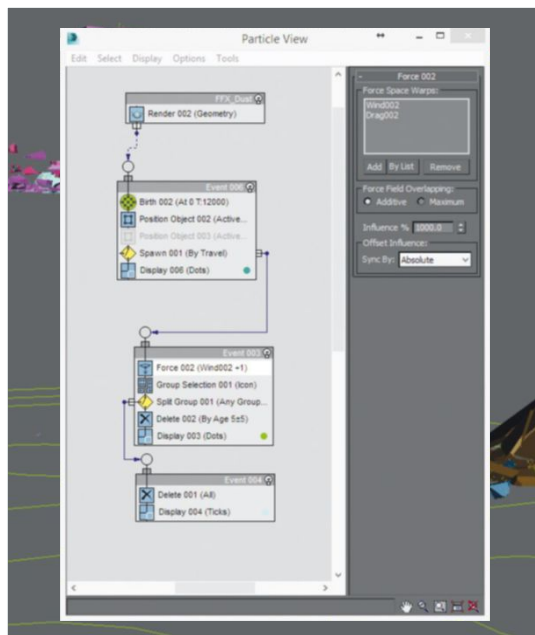
## SELLING THE SCENE

### Add extra debris and rocks

Outside of RealFlow, using particle system, you can fill the gaps between each chunk and its neighbouring blocks with particles. Once done, you can instance some small rocks for each particle and have them welded to the closest piece, allowing them to break when a certain velocity is reached. Inside RealFlow (during the fracturing stage, before having everything in RealFlow), you can increase the gaps between pieces, and fill it with a rift, which you can fracture later inside RealFlow using Voronoi tools, and again, you can connect them to each other and to the main structure using multijoints tools. Inside and outside RealFlow, you can emit particles based on collisions (a simple Python script can do this), then you can replace each one of these with any kind of small stone inside the 3D app after importing the particles and everything else.

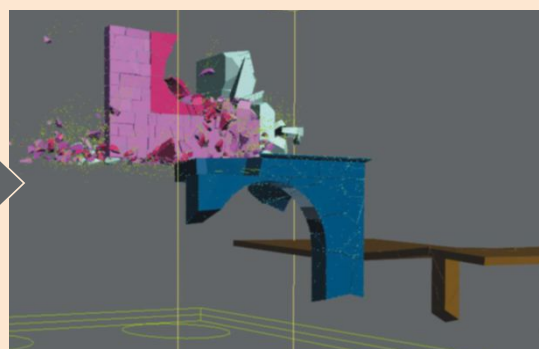
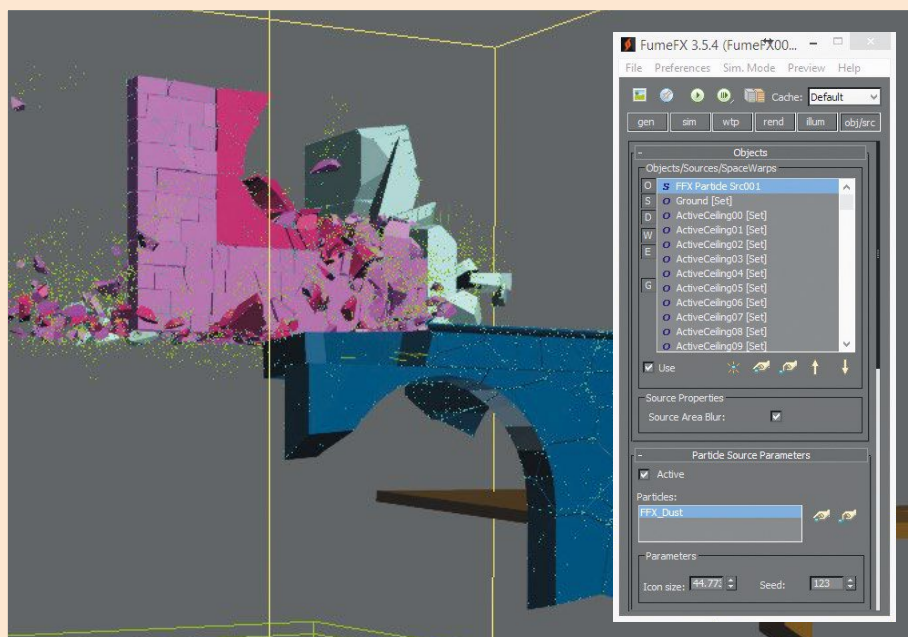


A wind force with a minus value can simulate both gravity and turbulence, which we need because we are simulating smoke



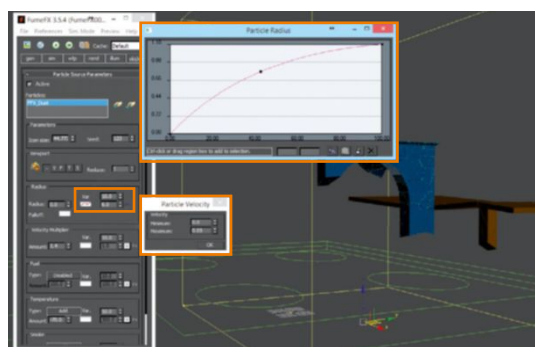
## 12 CONTROL THE PARTICLES

Add a Force node to control the movement of the particles. A wind force with a minus value can simulate both gravity and turbulence, which we need because we are simulating smoke, as well as a Drag Force node with 5, 5, 5 to simulate air resistance; you can delete the particles under the ground plane by adding Particle Group Selection and Group Split then delete all the particles inside the group; and then set the Group Selection to continuous update.



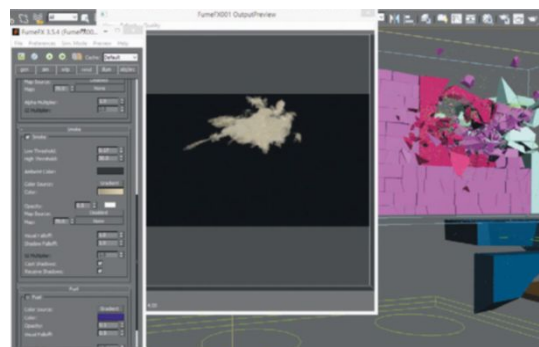
## 13 CREATE A CONTAINER

Go to Create>Geometry>FumeFX to create a container. Make sure it includes the objects emitting smoke and set Steps to 4; and create a folder to put your sim files in from the path menus. Set Turbulence to 1.5, scale it to 5 and 5 for details, create a particle Source from Create>Helpers>FumeFX>Particle Src, and pick the particles as its source. In FumeFX Objects, select the Source and all the church objects to let smoke collide with them when generated.



## 14 SET A GRADUATED GROWTH

As we don't want FumeFX to emit any smoke before the church starts to fall, we need to set a graduated growth for the smoke radius. Change radius to 0, activate the curve beside it by right-clicking and select Enable; set 6 for the next radius growth, and right-click beside it on PA, change it to Particle Velocity, left-click on it and change the Maximum into 0.05, to ensure the smoke radius for each particle will grow based on its velocity; set Velocity Multiplier 1.4.



## 15 FINAL TWEAKS & SIMULATE

Now, add two lights and raytrace shadows; these can be selected in FumeFX's Illumination tab. Also, change the Rendering tab's setting by adding a gradient colour bar to describe the smoke's look by right-clicking or selecting Color and then Key mode, and playing with its opacity to define its thickness... and then simulate! When you're done, render the sequence with the default rendering setting to see your animation in action. ■



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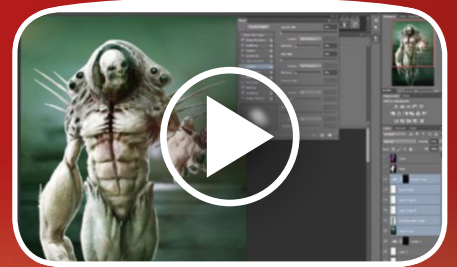
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# CREATE A RICH AND DETAILED STILL LIFE

*Zeno Pelgrims* demonstrates the power of XGen and Arnold to create a South American market scene



## ARTIST PROFILE

### Zeno Pelgrims

Zeno is a CG student with a passion for animation and VFX. When he's not waiting for render buckets, he can be found staring at the great intricacies of the world.

[zenopelgrims.com](http://zenopelgrims.com)

Over the next few pages, I will explain my thoughts behind this South American scene and describe the techniques used to create it. The inspiration for this image sprouted from the incredible amount of wanderlust I've been having lately. This world has so much beauty to offer and I want to see it all!

Knowing my scene will be scattered with pots which have many beads scattered on them, it's really important to try to nail the appearance of a single bead to the smallest possible level.

I start by using some curve-based modelling techniques to make the pots, then shade them using the alShader library and instance thousands of beads on the pots using XGen. After that I will explain how I approach lighting a scene and describe some noteworthy techniques to consider when compositing.

Once I am at the point where I know exactly what I want to create, it is time to do some research. I really feel like this might be the single most important part of the whole

process and therefore I always try to push myself that extra bit. I'm itching to get started, but I've found that the longer I research my subject, the more believable the image I make will be. For example, while researching what beads actually look like I discovered that the metallic appearance of them comes from the thin metal inner structure inside the hole. Details like these make a big impact on the final look of the image.

For all the assets you need go to [creativebloq.com/vault/3dw207](http://creativebloq.com/vault/3dw207)

## EXPERT TIP

### XGen limitations

It is important to keep in mind some of XGen's limitations to avoid trouble further down the line. XGen can't handle topology changes of the geometry you will instance on, so using some proxy geometry is usually a good idea.

XGen also doesn't read object transformations, so everything needs to be deformed on component/vertex level.

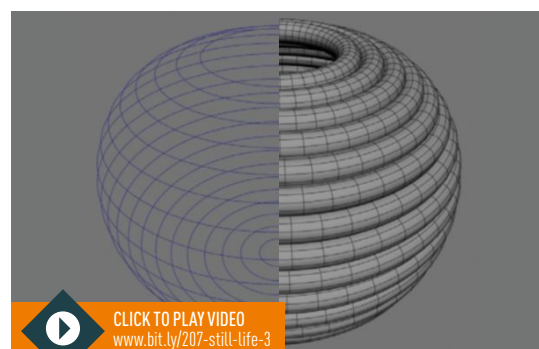
## TOPICS COVERED

Modelling  
XGen  
Look development  
Lighting  
Compositing



## 1 PLAN THE MODELLING

Whenever I begin a project I try to keep the end in mind. So when thinking how to approach the modelling of the pots, I also think about how XGen will eventually scatter the instances across a surface. The best way to scatter them will be in a uniform manner, which means that the quads of our pot should represent the shape of the beads as much as possible – ensuring a tight fit for all beads. This geometry will be used both for my XGen base and the creation of the wooden elements.



## 2 MODELLING THE WOOD

I select all the horizontal edge loops and convert them to curves. Go to Modify>Convert>Polygon Edges to Curves. I do the same for a single vertical one. Using Janos Hunyadi's primGen plug-in for Maya, I use the curves to easily create cylinders. I can do the same by creating an extrusion along the curve, but using Janos's plug-in is much faster. It also lays out the UVs properly – always a winner!





#### MARKET INFLUENCE

Zeno's wanderlust is the inspiration for this scene. He recommends that you look for the fine details to make your work shine



## TUTORIALS

Create a still life scene

### VARIETY IS VITAL

Make sure you model enough variation where it's needed. Duplicated objects placed next to each other can very quickly feel very CG

### MAKE IT BELIEVABLE

Incorporate wear and tear

When shading objects I always add slightly more wear and tear than I see in my reference. Usually a lot of detail gets lost in a scene due to various factors such as lighting, motion blur, depth of field and even softening aliasing filters. Since I obviously can't create all possible wear and tear in a scene (you need an incredibly good eye for this!), I need that extra bit of surface irregularity to push the believability and visual interest of a scene.



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### 3 MODELLING WOVEN WOOD

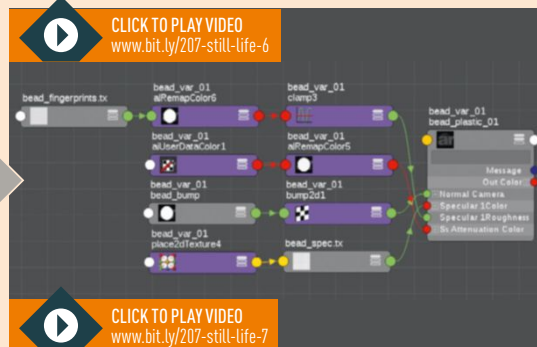
For the straps of wood holding the horizontal ones together I use the vertical extracted curve, apply primGen and adjust the curve to weave the cylinder in between the horizontal pieces. Four variations should be enough. I lay out the UVs, change the pivot of the objects to the scene origin and duplicate as many times as needed. A crucial last step is to add small, individual variations. This is needed to create a believable handmade object.



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[www.bit.ly/207-still-life-5](http://www.bit.ly/207-still-life-5)

### 4 MODELLING THE BEADS

The beads themselves are super simple; a thin metal cylinder inside of a bigger plastic cylinder. The key here is to not have intersections between the two parts, as that would affect how the refraction looks. The beads I am interested in for this image aren't perfect, and this is something we need to take care of; with the Sculpt tool in Maya 2016 I pull, pinch and inflate parts. Subtle imperfections are very important! I also keep the polycount as low as possible.

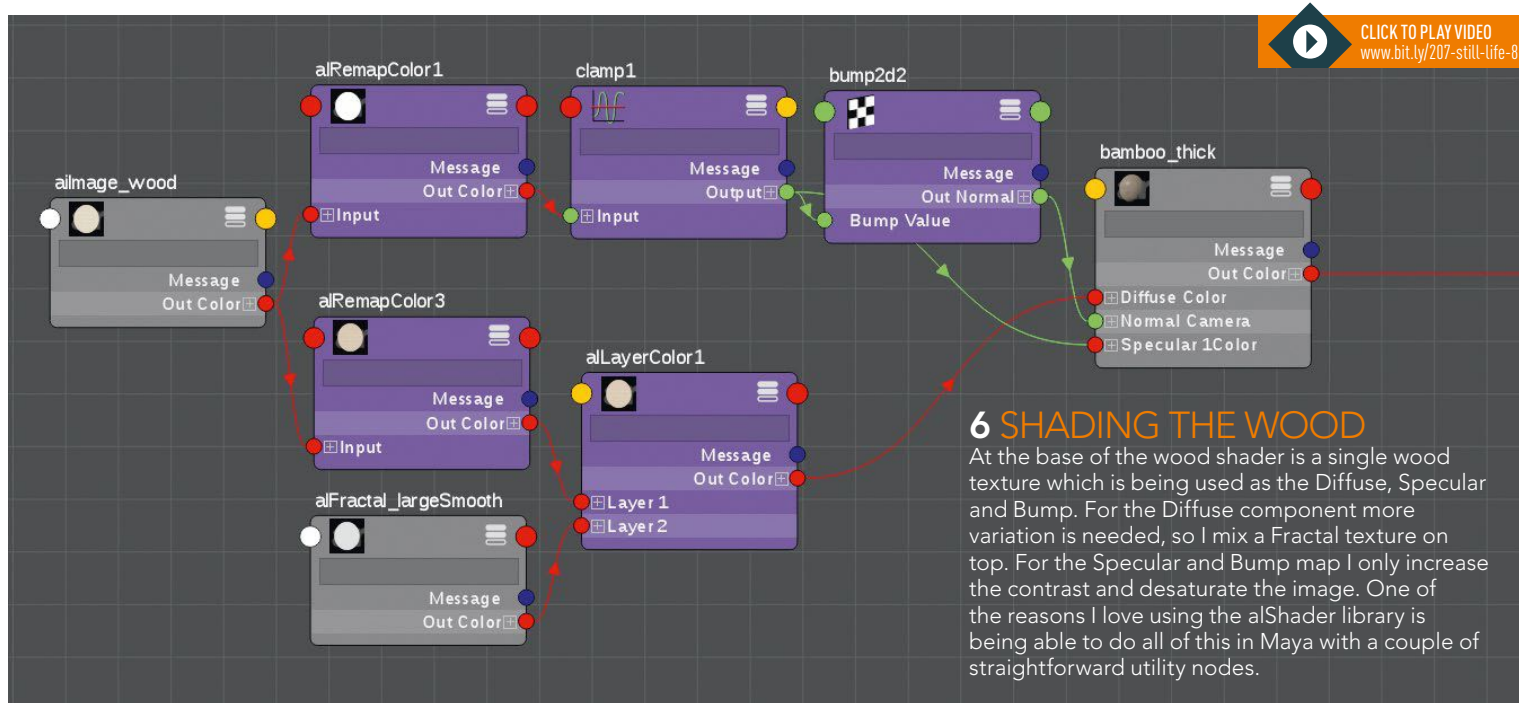


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### 5 SHADING THE BEADS

I've been using Anders Langlands' shader library for Arnold; alShaders. It's a great collection of shaders and utility nodes. Shading should start with research to find references for a visual library. The bead shader isn't complex: a tileable scratch texture plugged into the bump slot, a fingerprints texture controlling the specular roughness, another breakup map to control specularity levels and a node controlling transmission attenuation colour, which will get past Ptex colour data from XGen.



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### 6 SHADING THE WOOD

At the base of the wood shader is a single wood texture which is being used as the Diffuse, Specular and Bump. For the Diffuse component more variation is needed, so I mix a Fractal texture on top. For the Specular and Bump map I only increase the contrast and desaturate the image. One of the reasons I love using the alShader library is being able to do all of this in Maya with a couple of straightforward utility nodes.

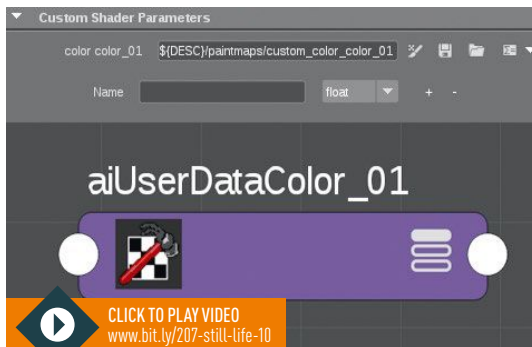




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## 7 INSTANCING WITH XGEN

Time to instance some geometry! I export the beads as an XGen archive and load them in. It makes most sense to instance them in a uniform manner. To break up the perfect CG appearance of uniformly scattered beads I use a couple of Rand() expressions on parameters like width, length, depth and twist.



CLICK TO PLAY VIDEO  
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## 8 CUSTOM SHADER PARAMETER

To colour the individual beads with a Texture map I need to pass this shading data through a custom shader parameter to XGen with the help of an aiUserDataColor node and convert it to a Ptex file. XGen only reads Ptex data, but makes it as easy as the click of a button to convert it.

### EXPERT TIP

#### XGen aiOpaque

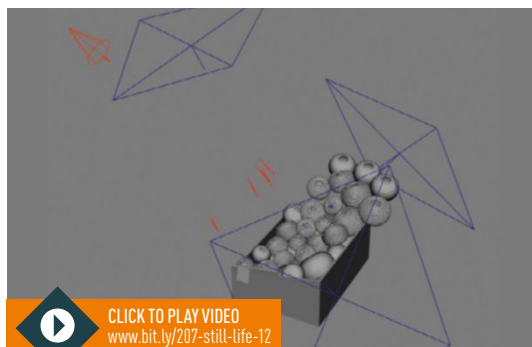
When dealing with objects with refractions, it is really important to remember to disable the aiOpaque checkbox on the XGen collection level.



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## 9 LIGHTING CONSIDERATIONS

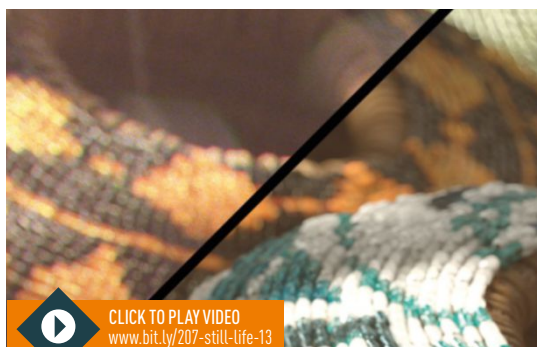
Lighting is one of my favourite parts of the pipeline. With only a few adjustments I can change the whole feeling of the scene. This is why this step needs a lot of thought. The main questions I ask myself beforehand are 'How can the lighting help tell my story?' and 'What do I want the viewer to feel?' The lighting needs to support the emotional moment of a scene; it needs to be believable and needs to guide the viewer's eye to the story I am telling.



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## 10 LIGHT SETUP

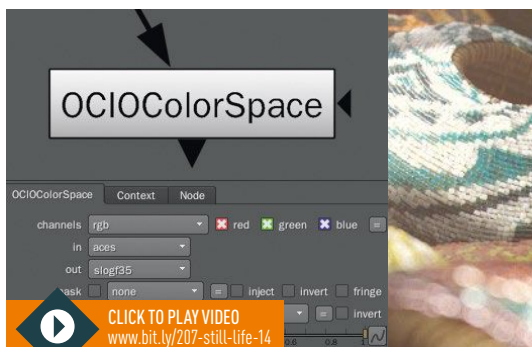
For this scene I want to create the look and feel of a South American marketplace. It has to feel inviting and easy to look at. For this scene I use a three-point light setup. One spotlight with a gobo as my keylight (the sun), a big soft rim light and a big soft fill light. Because it is hard to art direct the gobo, I use a couple of Spotlights to help light certain parts of the pots.



CLICK TO PLAY VIDEO  
www.bit.ly/207-still-life-13

## 11 CAMERA IMPERFECTIONS

Avoid pure blacks while lighting a scene. These almost never appear in photography and can therefore make the scene look CG. I try to avoid this by adding a small amount of volume scattering in my scene. Since I'm aiming to create a photorealistic image, it's important to take lens and camera imperfections into account. Film grain, custom bokeh kernels, lens vignetting and chromatic aberration help to trick the viewer into thinking your image is a photograph.



CLICK TO PLAY VIDEO  
www.bit.ly/207-still-life-14

## 12 CUSTOM GAMMA CURVE

Instead of applying the default 1/2.2 gamma curve to my scene linear image, I use a custom one. In Nuke one way to do this is by switching your OCIO Config to ACES, and pick a curve with the OCIOColorSpace node. Here I will use Sony's SLog35. To view and export the image properly I need to switch my colour space in my viewer from SRGB to None, and tick the Raw Data tickbox in the Write node. For more information on this topic, check out [www.cinematiccolor.com](http://www.cinematiccolor.com)! ■

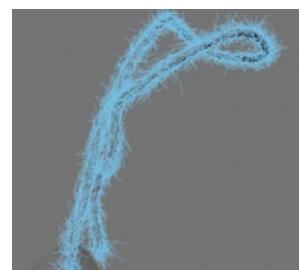
### ADDING EXTRAS

## DETAILING PRICE TAGS USING XGEN



### ONE MODEL PRICE TAG STRINGS

To create the strings I start by creating a rough curve and then apply the PrimGen plug-in to it. Playing with the Twist function and the rope segments I create a rope-like appearance.



### TWO XGEN HAIR SYSTEM

After applying XGen to the string geometry, I use the TiltU parameter to flatten out all the hairs. Then I apply a Noise modifier to give it the desired scruffy appearance.



### THREE HAIR SYSTEM SHADER

Things don't always need to be complicated. In theory you could use a complex hair shader for the hair system, but practically a rough diffuse shader will work just fine.





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# ADD DRAMA TO YOUR ENVIRONMENTS

**Romain Lavoine** shares his insights into creating a scene with drama and realism using Pixar's RenderMan

For a long time now I have wanted to create this project. My main reference is the urban photography movement called urbex. To sum up, it's the exploration of abandoned man-made structures. I spent a lot of time online searching for good references.

Looking all these abandoned places where people used to live is amazing. The classical paintings (like Giovanni Paolo Panini's ruins paintings) apocalyptic movies and TV series also inspired me a lot – mostly The Walking Dead and I Am Legend. I really like architecture and trains so

I thought about creating this abandoned train station.

The cool thing about this kind of project is that you can really have fun with modelling, texturing and lighting, to give to your image a nice mood. I'm a big fan of hard surface modelling so I really appreciated this part of the project.

There are a lot of assets to take care of and a lot of work to do. I created this project in my spare time and I think that personal projects are one of the best ways to learn and experiment techniques. It took me about three months to complete the project.

For all the assets you need go to [creativeblog.com/vault/3dw207](http://creativeblog.com/vault/3dw207)



## CREATING REALISM

Romain took inspiration from urbex, the urban photography movement which explores urban, man-made structures



## 1 REFERENCES

When starting a project gather as many references as possible. You'll come back to these all the time so do it well. I started collecting references about abandoned places and architectures then searched for trains and the different objects you can find in a train station. I really recommend using the Kuadro software – a free image viewer. It allows you to place, scale, rotate as many references as you may need in your screen [www.kruegames.com/tools/kuadro](http://www.kruegames.com/tools/kuadro).



## ARTIST PROFILE

**Romain Lavoine**

Romain is a student at ESMA Montpellier in France (IPAX Certified) and is interested in lighting, shading and compositing. Romain is currently co-directing his graduation short film. [lavoineromain.com](http://lavoineromain.com)

## TOPICS COVERED

Texturing  
Modelling  
Lighting  
Detailing

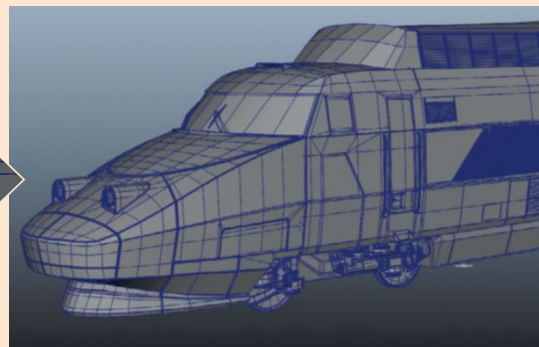
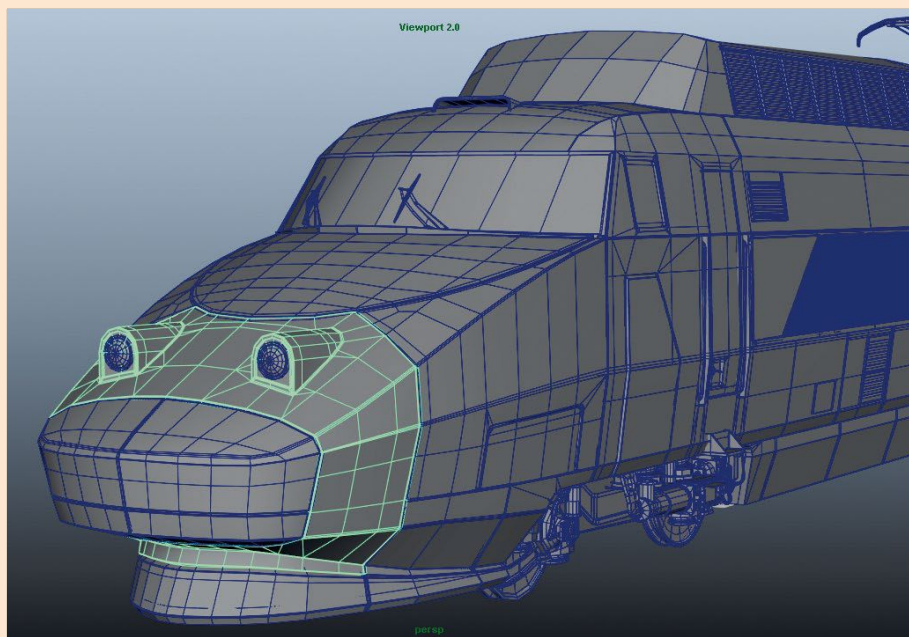




## 2 LAYOUT AND COMPOSITION

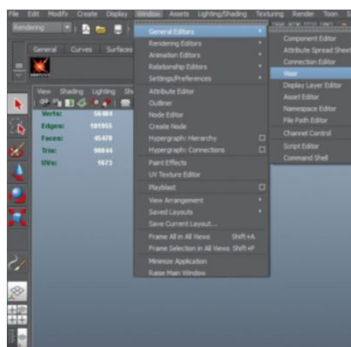
I start creating my environment illustration by placing some basic polygon shapes in my scene. You'll find doing this gives you a simple and rough idea of what your scene is going to look like. I place the main objects and don't go too far into the modelling at this stage as I'm only looking for a rough guide to how my final composition will look. Every basic mesh is going to be replaced by the final models, so there is no need to worry

about topology during layout. I always try to make every area of my image interesting when working on an environment illustration like this one; but make sure you don't get lost in the image and pay careful attention to camera placements. Though we're working in a 3D space it can be useful to employ traditional art theory on the rule of thirds and the Golden Ratio to ensure a balance to the scene.

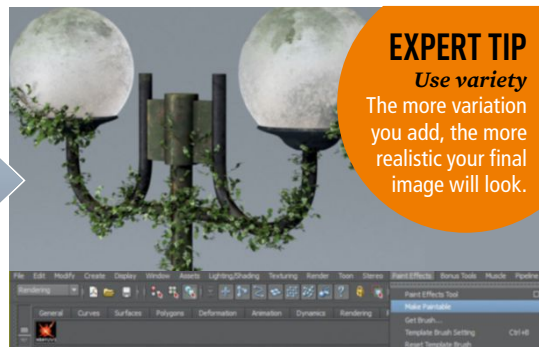


## 3 THE MODELLING STAGE

Again, go back to your references and display some on your screen. Depending on how far your object is from the camera, choose the right amount of details. Always work with real world units to avoid problems later on. I recommend using the Modelling toolkit in Maya, as it gives you access to the main modelling tools and makes you work faster. I also work a lot with shortcuts to save me some time.



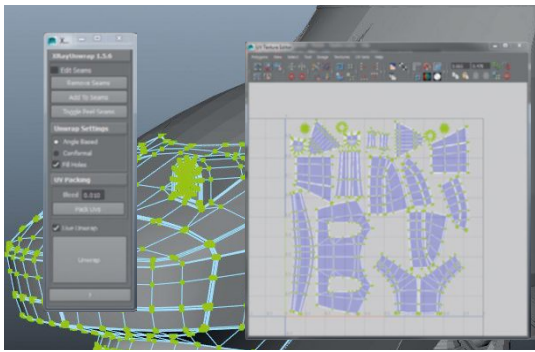
**THINKING AHEAD**  
Romain uses Paint FX a lot and always saves the stroke in case it's needed for a future project



## 4 USE PAINT EFFECTS FOR IVY

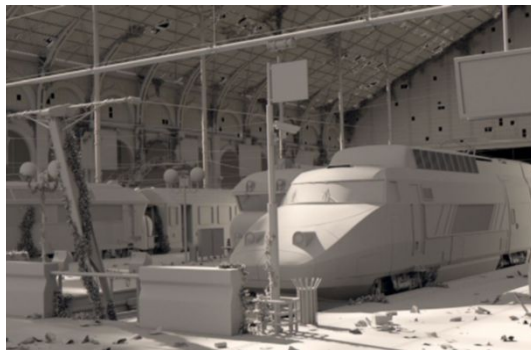
As I'm creating an abandoned place, I wanted ivy in my scene and Paint Effects are perfect for this. Go to Window>General Editors>Visor>plantsMesh and choose the ivy.mel. To use them, select your object and go to the Paint Effects tab (Rendering mode for Maya 2015 or Modeling>Generate in Maya 2016) and click Make Paintable. When you're happy with the look of your stroke, go to Modify>Convert>Paint Effects to Polygons, check Quad Output and Apply.





## 5 MAKING UVS EASIER

UVs are definitely not the most enjoyable part of the work but they need to be done correctly to avoid problems during texturing. I used a very cool script called XrayUnwrap, from Raylight to help me when unwrapping UVs, you can download it from the website at this link: [www.raylightgames.com/xrayunwrap\\_maya](http://www.raylightgames.com/xrayunwrap_maya). It's not free but it's definitely worth the money. It's the fastest tool I have ever used for UVs within Maya.



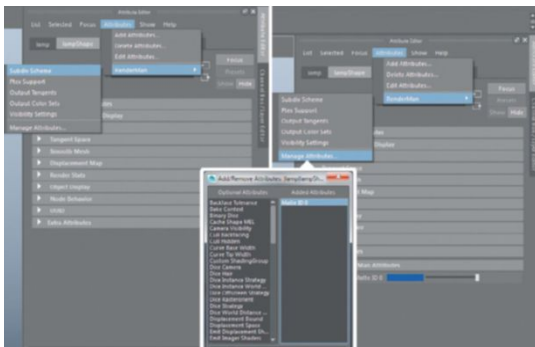
## 6 LIGHTING IN RENDERMAN

I used RenderMan RIS for rendering. I created an Environment light with an HDR and placed a few more lights in the scene. As the roof is partially destroyed, I put my key light above it to get nice shadows. The Pixar Standard Area light has really cool functionalities. You can enable the barn doors to focus a bit more light in certain areas. You can also set up the Component Weights to choose how much the light is going to influence the specular or the diffuse.

### PLAY WITH LIGHTING

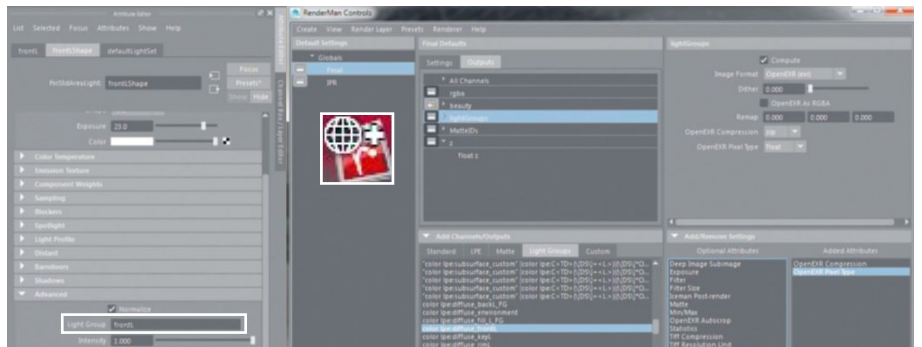
Disable every light and only keep the one you're working on. Then enable them all and adjust the exposure if necessary

Assign multiple lights inside a group or split each light in your scene. The more you split, the more control in compositing



## 7 RENDERMAN ATTRIBUTES

RenderMan has a lot of hidden Attributes that you can enable when you need them. For instance, instead of smoothing your model, you can add a Subdiv Scheme by clicking in the Shelf button or by going to Attribute Editor>Attributes>RenderMan>Subdiv Scheme. You can also add a Matte ID to your object in order to get an ID pass that you can use in compositing for isolating objects.



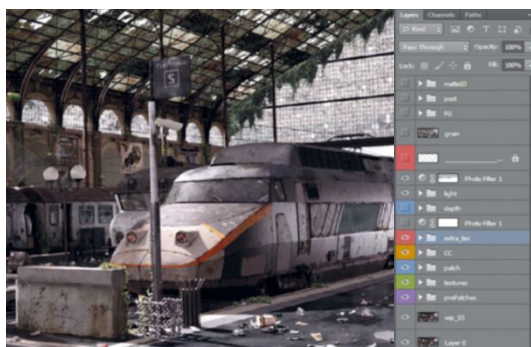
## 8 SET UP THE PASSES

Enable the Light Groups to separate each light. Select your light and go to the Advanced tab. In the Light Group field, choose a name for the Light Group (either assign multiple lights inside a group or split each light in your scene). The more you split, the more control in compositing. When finished, open RenderMan Controls and go to Final Defaults settings. In the Light Groups tab, select the desired passes. Right-click>Create One Output from Channels to get a multichannel EXR.



## 9 SPLIT THE PASSES IN NUKE

Import your EXR into Nuke and shuffle the passes in order to rebuild your beauty pass. I really recommend you use Backdrop and Dot nodes in order to stay organised in your Nuke script. When it's done, adjust the intensity of the light and the specular. You can also tint your lights and speculars by adding a Grade node and adjusting the parameters.



## 10 DETAIL IN PHOTOSHOP

When I was happy with the look of my image in Nuke, I import my image into Photoshop in order to add more details. I start by adding more textures and dirt. I also enhance the contrast of certain areas or objects using the Matte ID I created in Maya, to create variation. This step is important so you get a better legibility of your image. When everything is finished I add the chromatic aberration, the vignetting, and the depth of field to enhance the realism of the image. ■

### ADD ATMOSPHERE TO YOUR SCENE

Using Depth Layers

I really recommend using the Depth Channel as a mask in compositing to create some nice atmosphere effects. In Photoshop you can copy the Depth Layer into a new alpha channel, then [Ctrl]-click on this new alpha to select it. You can now use this selection as a mask for any kind of layer. I've also added some smoke by using the same technique. If you need to work more specifically in a certain area, select the mask and go to Image>Adjustment>Level to enhance the mask and play with the depth effect.





## CINEMA 4D

# CREATE A FOLDING PAPER ANIMATION

**Ridvan Maloku** shows you how to use basic tools to create a complex looking, paper style animation



### ARTIST PROFILE

#### Ridvan Maloku

Ridvan is a motion graphics artist and 3D generalist, who currently works at Ataboy Studios in New York City. In his spare time he creates tutorials, mostly for Cinema 4D.

[plasticpistols.com](http://plasticpistols.com)

This style of animation is very popular, and has been seen in everything from TV commercials to short movies. In this tutorial we will cover everything you need to know about how to build your own folding paper animation inside Cinema 4D.

We'll start by learning how to model. Because we are aiming to create something that looks like it's made out of paper, we don't need to be 100 per cent accurate. This can be a good place to start for people who are new to modelling, and want to begin

learning. We're going to keep our model as simple as possible, but we still need some details to make our scene more complex.

After we finish modelling, we'll split the object in many pieces so that we can apply deformers. Animating with basic tools like deformers can sometimes make your animation look a bit cheesy, but by combining different techniques you can really take it to the next level.

More than 90 per cent of this animation was made using multiple iterations of the Bend Deformer. By using great features

inside Cinema 4D like Physical Sky, we will make our scene look beautiful and believable.

Some parts of this tutorial are very hard to explain with words, so for each step I have provided you with a short walk-through videos, so everything is easier to understand and you don't miss a thing.

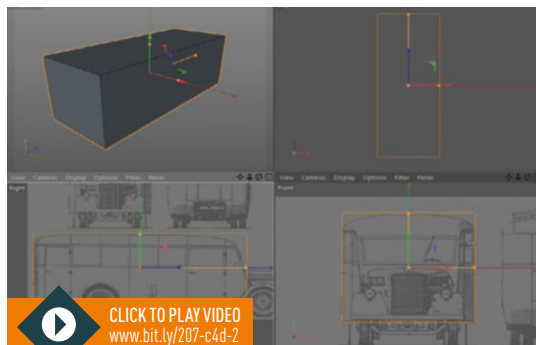
Before we dive in, make sure you get the blueprint from this link: [www.bit.ly/c4d-draw](http://www.bit.ly/c4d-draw) and download this package of 12 paper textures [www.bit.ly/c4d-dribble](http://www.bit.ly/c4d-dribble).

For all the assets you need go to [creativebloq.com/vault/3dw207](http://creativebloq.com/vault/3dw207)

### EXPERT TIP

#### Obtain accurate cuts

For accurate cuts on your object with the Knife tool, lock the highlighted line (cut preview) by pressing [Shift]. By changing the Offsets in the Attribute Manager you can specify the position of the cut. Click the viewport to finish the cut.



## 1 SETTING UP THE SCENE

Start by loading the blueprint on the right view by holding [Shift]+[V] and then press the Back button. Increase the Transparency to 90 per cent. Centre the side view of the blueprint by changing the offsets; Offset: X: 60, Y:135. Next, add a cube and resize it to match with the blueprint; X: 245cm, Y: 225cm, Z: 640cm. Now on the front view, you can use the cube as a reference to center out the front view of blueprint; Offset X: 150, Y: -160.

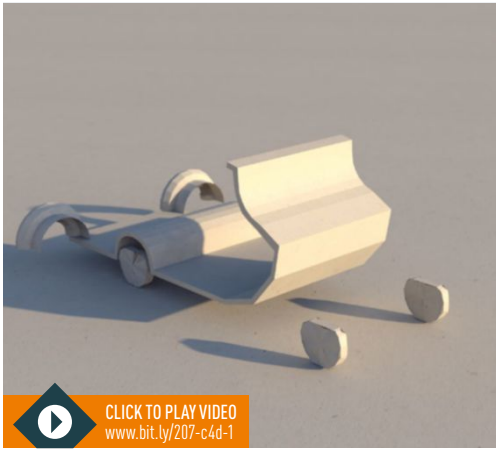
## 2 BLOCK OUT THE OBJECT

Make the cube editable [C]. Switch to Point mode, then from the right view, use the Knife [K] to add some cuts based on the blueprint. Then reshape the cube by using the Rectangle Selection tool. On the front view repeat the same process. Within Polygon mode, select the polygons that represent side windows and using Extrude Inner [I] extrude them slightly, then press [Delete] to get the holes. Use the same technique to create the front and back window.

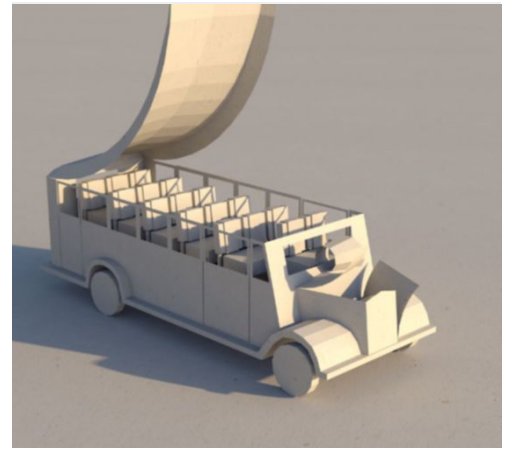
### TOPICS COVERED

Modelling  
Animation  
Texturing  
Lighting  
Rendering





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**FASHIONABLE FOLDS**  
This popular style of  
animation is often seen  
in TV commercials  
and short films





## TUTORIALS

Paper style animations

### ADD DETAIL

To give extra detail to your object create a gap between the doors and the bus



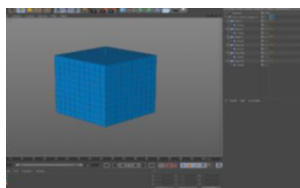
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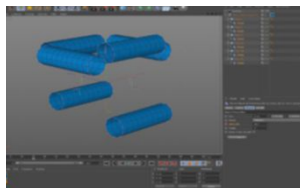
### USING DEFORMERS

## BASIC DEFORMERS THE WHOLE SECRET LIES HERE



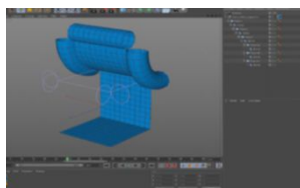
### ONE CUBE WITH THE BEND DEFORMERS

Open the Cube\_Start.c4d. Here we have a cube made of six planes, and for each plane we have applied the Bend Deformer. Select all Bend Deformers by holding [Ctrl].



### TWO ANIMATING YOUR BEND DEFORMERS

On the frame 0, increase the Strength to 360°, add a keyframe (Hold [Ctrl] and click the circle next to Strength). After 15 frames bring the Strength back to 0 and add another keyframe.

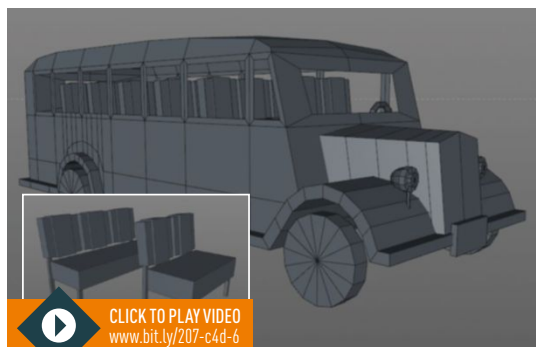


### THREE NEST THE BEND DEFORMERS TOGETHER

Delay each Bend Deformer for 10 frames (Face 4a, 4b and 4c should be treated as a single face). Now make each face a child of the other.

## 3 MODELLING

Add some extra cuts so we can create room for the back wheels by tweaking the new points. Select all the polygons on the bottom and split them from the object (right-click and select Split). Now we should have two objects, so rename the second one 'Bottom'. Select all the polygons from that object and Extrude [D] them down slightly. Make sure you switch Create Caps on. Reshape the bottom object by adding some extra cuts and tweaking points.



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## 4 FINISHING THE EXTERIOR

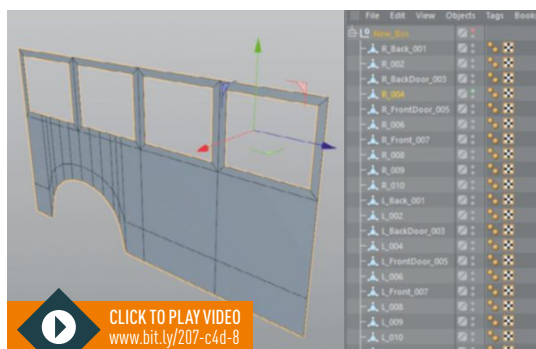
To create the bus hood the drill is the same: add a new cube, re-position and resize the cube to match with the blueprint, and make the cube editable so that you can add some extra cuts to reshape it. To create the lights, start a new scene, and by using a Bezier Spline and the Lathe Object create the head of the light. The rest of the objects, including the wheels, are created by using cylinders.



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## 5 CREATE YOUR INTERIOR

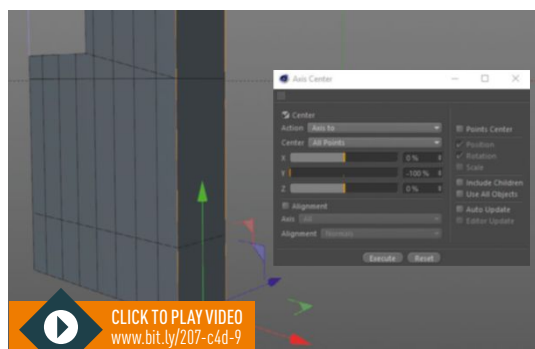
We will not stress too much over the interior. Again, create a new scene. Initially try to create the passenger seats by using cubes. Then make a group (select all objects and press [Alt]+[G]), and rename it 'Passenger Seats'. Make a copy of this group and rename it 'Driver Seat'. Try to make the driver seat a little smaller on the width. Bring the seats into your last scene and place them where they need to be.



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[www.bit.ly/207-c4d-8](http://www.bit.ly/207-c4d-8)

## 6 SPLITTING THE OBJECT

Now you need to split the object into small pieces. In this step keeping things organised is very important. First select all the objects, make a group and name it 'Old\_Bus'. Now as you split the objects, drag them outside of that group, and name them properly. To keep the naming structured, use a prefix based on their position; 'R' for objects on the right and 'L' for the objects on the left.



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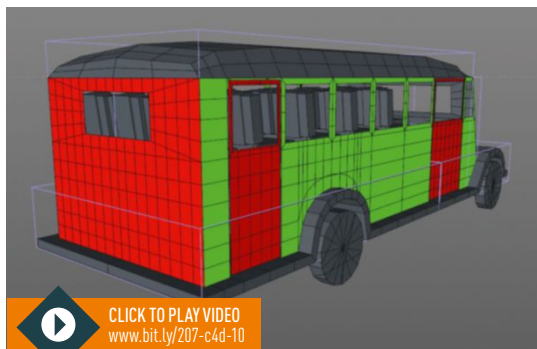
## 7 USE TRAFFIC LIGHTS

I assume that by now you should have everything organised regarding your labelling and groups. Applying deformers with all objects visible within your scene can be a very frustrating process. I suggest you hide all the objects except the object that you will work with. You can do that easily by using Traffic Lights (two dots on the side of every object). First, make sure that all the objects are part of one group, so that you can hide all objects at once.

## 8 APPLYING DEFORMERS

Fixing axis points is a crucial step. Knowing we'll scale these objects on the edges, most of our axis should not be in the middle. Use the Axis Center tool (Mesh > Axis Center) to fix the axis for each object. To apply the Bend Deformer on the selected object, hold [Shift] when you select it in the menu. Sometimes the Bend Deformer will bend your object in the wrong direction. Use the Rotation tool on the deformer to fix this. Add extra segments by using the Knife tool.

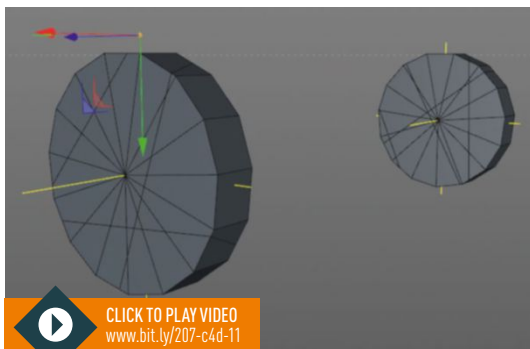




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## 9 PLUG THEM TOGETHER

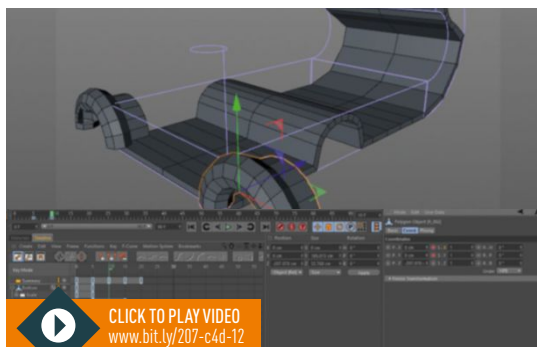
The beauty of Cinema 4D is that you can make increasingly complex effects by using an alternating series of nested objects and Bend Deformers. Keep in mind it's not necessary to nest them all together; you can keep it as low as two objects, and some of them don't have to nest together at all. Based on how your objects deform, you may need to add additional segments as you go along.



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## 10 DEFORMERS FOR WHEELS

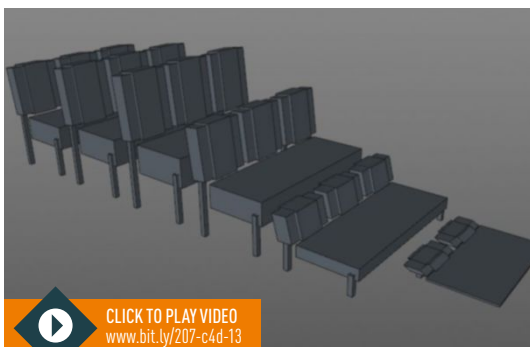
For the wheels we will use the Melt and Displacer Deformer. Now this part is a little tricky. If you select the wheel while holding [Shift] and apply the Melt, it is going to disorder the position of the wheel. To fix this, go to Character>Commands>Reset PSR. Now decrease the Strength to 0 and rotate the Melt deformer 180° on Pitch (P). Finally, apply the Displacer on each wheel with Noise as a Shader to get that crumpled paper look.



CLICK TO PLAY VIDEO  
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## 11 ANIMATION

Before you do anything else it's a good idea to specify the frame rate, by pressing [Ctrl]+[D] to open Project Settings. I was using 30 FPS. It's also a good habit to keep the Timeline (Window>Timeline) open every time you animate, so that you have some room to play with keyframes. Most of my Bend Deformers were keyframed for 10 frames and each object was delayed for five frames. For every object that has a Bend Deformer, I have keyframed the scale as well.



CLICK TO PLAY VIDEO  
www.bit.ly/207-c4d-13

## 12 ANIMATING THE SEATS

Because the seats have no deformer whatsoever, we will animate them just on the scale. We can do this by selecting all the seats, and on the coordinates for the first frame, bring the Scale Y to 0. After 10 frames, we bring the Scale Y back to 1. If you want to create little overshoot, you can add another keyframe between the two by changing the Scale Y to 1.2. To hide the seats in the first frame use the Display Tag.



CLICK TO PLAY VIDEO  
http://bit.ly/207-c4d-14

## 13 TEXTURING

Before we create our material, add the floor and a camera to the scene. Activate the Camera View by clicking the target icon on the side of the camera. Change the Focal Length to 80mm. This type of Camera will make your object look like a miniature. Now create a material and for the Color by using one of the seamless paper textures. For the Bump create a grayscale version of the same texture using Photoshop.



CLICK TO PLAY VIDEO  
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## 14 LIGHTING AND RENDERING

To light the scene we will use Physical Sky. Physical Sky is a very powerful feature inside Cinema 4D, which combines the light source (sun), the environment (sky), and much more in one single tool. I also like it because you can change the date, time and location. If you're going for a sunny day look, change the month to July. Physical Sky without Global Illumination doesn't look realistic, so make sure in the Render Settings to introduce Global Illumination. ■

## THINK ANIMATION!

### Use Symmetry to save time

Before you apply the deformers, it's good to think of the animation. Most of the right and left objects are moving at the same time in our scene. To save time, I would recommend you work with the objects on the right side (from back to front) then use Symmetry (Create>Modeling>Symmetry) for the objects on the left side.

Because the seats have no deformer whatsoever, we will animate them just on the scale

## EXPERT TIP

### Keep the Timeline organised

Drag and drop objects from the Object menu to the Timeline menu. To remove from the Timeline, right-click the object and choose Remove Selected Object.



**SECRET  
LABS.XYZ**

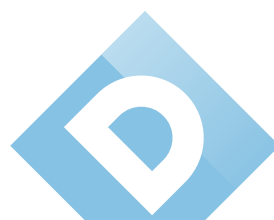
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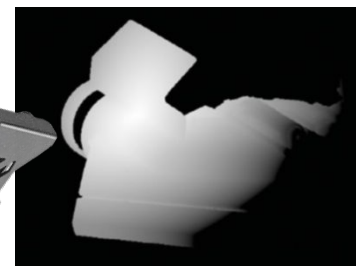
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# Consumer versus professional graphics cards

*James Morris asks: Are workstation graphics cards worth the extra cost over their consumer-grade equivalent?*



## AUTHOR PROFILE

**James Morris**

James has been writing about technology for two decades, focusing on content creation hardware and software. He was editor of PC Pro. [webmediology.com](http://webmediology.com)

We are frequently asked by readers whether the considerably greater cost of professional workstation graphics accelerators over their consumer equivalents was worthwhile. The Nvidia Quadro M4000, for example, has 1,664 CUDA cores, which is the same number as the Nvidia GeForce GTX 970, although the latter has 4GB of GDDR5 compared to the M4000's 8GB, and the 4GB is divided into an unusual 3.5GB + 0.5GB configuration with the smaller portion of frame buffer

There are some valid support-related reasons for the price differential, and this starts with manufacturing quality

Pro cards offer perks not available to consumer cards, such as AMD's standard three-year warranty on its FirePros, with 24/7 support

running quite a bit more slowly. But the Quadro M4000 will set you back around £650 plus VAT, whilst a standard GeForce GTX 970 is just a tad over £200. That would seem like a ridiculous difference – more than three times the price. So we thought we would investigate the issue and give you a definitive answer.

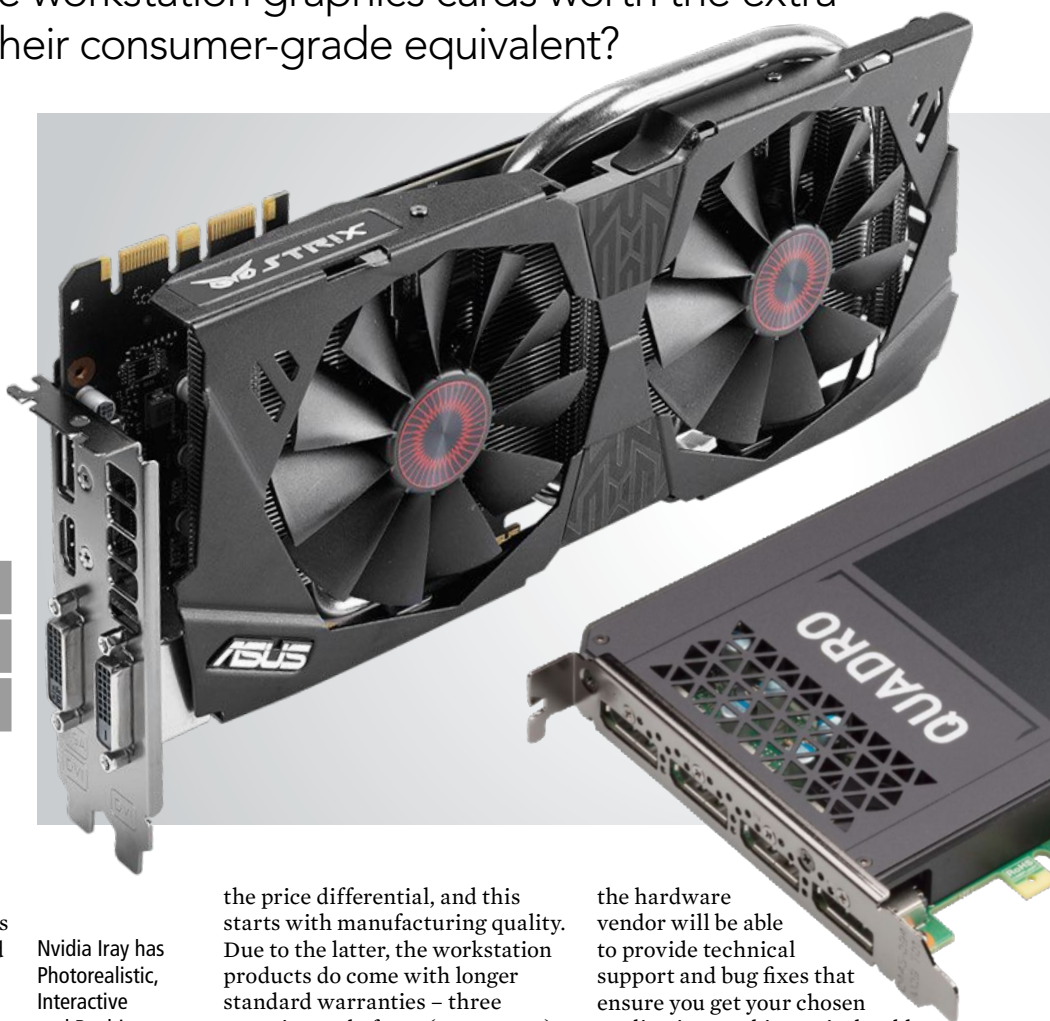
To begin with there are some valid support-related reasons for

Nvidia Iray has Photorealistic, Interactive and Realtime rendering modes

the price differential, and this starts with manufacturing quality. Due to the latter, the workstation products do come with longer standard warranties – three years instead of two (or even one), often with the option to extend to five. Another factor is software support (which we look at in more detail in The Vendor's Perspective boxout). Consumer-grade graphics cards manufacturers do not give any guarantee that their cards will work with any particular professional software title. Conversely, the makers of professional 3D content creation applications only test using professional-grade graphics cards, and will only certify specific driver versions with specific versions of their software, and specific operating systems. This in turn means that, in theory at least,

the hardware vendor will be able to provide technical support and bug fixes that ensure you get your chosen application working as it should. They probably would not provide support for hardware/driver/software combinations that aren't on their lists of compatibility.

It's also worth noting that, whilst you can find fairly close parallels between some models in the consumer and professional ranges, there is actually now increasing differentiation in features across the two lines. For example, Nvidia's Quadro K2200 is most closely paralleled by the GeForce 750 Ti, since both offer 640 CUDA cores and use the GM107 GPU from the Maxwell generation. But whilst the Quadro version includes 4GB



Iray photoreal

Iray interactive

Iray realtime



## DAVID AND GOLIATH

We put a popular professional graphics card up against its consumer-grade equivalent in standard workstation tests (readings = higher is better)

| Model (used with YOYOTech Renatus Pro M3) | Maxon Cinebench R15 |          | SPECviewperf 12 |           |         |            |             |         |       |
|---|---------------------|----------|-----------------|-----------|---------|------------|-------------|---------|-------|
|   | OpenGL              | Catia-04 | Creo-01         | Energy-01 | Maya-04 | Medical-01 | Showcase-01 | Snx-021 | Sw-03 |
| PNY Nvidia Quadro M4000                   | 152.56              | 84.77    | 68.61           | 5.87      | 68.77   | 25.26      | 43.7        | 72.94   | 101.3 |
| Asus Nvidia GeForce GTX 970 OC 4GB        | 167.78              | 53.41    | 32.72           | 6.07      | 103.7   | 29.88      | 61.08       | 5.96    | 50.1  |



of GDDR5 memory, the GeForce has a maximum of 2GB, although the basic GeForce 750, with 512 CUDA cores, is similar to the Quadro K1200, and does have 4GB versions, whilst the K1200 comes with 4GB as standard.

As you go up the range, this differentiation becomes more pronounced. The GeForce GTX 980 offers 2,048 CUDA cores with 4GB of GDDR5 memory, the GeForce GTX 980 Ti has 2,816 CUDA cores and 6GB of GDDR5 memory, and the GeForce GTX Titan X boasts 12GB of GDDR5 with 3,072 CUDA cores. There's no Quadro equivalent to the GTX 980 Ti, but the vanilla 980 parallels the Quadro M5000 in CUDA cores, whilst the GTX Titan X equals the M6000. All these consumer-grade cards are expensive, with the Titan X costing well over £800 inc

## THE VENDOR'S PERSPECTIVE

What do Nvidia and AMD have to say about why you should choose a pro graphics card instead of a consumer-grade one?

We asked Nvidia and AMD to comment. Both companies sent official statements underlining the professional certification of their Quadro and FirePro ranges.

### BENEFITS OF PRO VS CONSUMER

A lot of the quoted benefits are a little hard to quantify, such as the technical pre- and post-sales support. The support forums for professional cards will also be focused on issues with professional software rather than problems with the latest games. However, Nvidia also pinpointed driver features that would be beneficial to the professional user. Aside from being optimised for professional applications, Nvidia's Quadro drivers also ship with a huge list of presets for specific applications. But there is now also increasing interest in harnessing the GPU power for realistic live rendering and even accelerated final output.

In SolidWorks, the RealView mode only works with Quados (and AMD FirePros), not consumer-level cards. This means the highly useful Ambient Occlusion, which operates through RealView, will only work with professional hardware. However, although Nvidia talks about ActiveShade in 3ds Max being only officially supported via Nvidia Iray or Nvidia mental ray running on Quados, it's still compatible with consumer-grade cards. It's a similar story with the recently released SolidWorks Visualize, which is based on the Bunkspeed software that Dassault Systemes acquired when it purchased a 84 per cent stake in maker Realtime Technology AG in December 2013. This is certified with Quados, but potentially can run on

any CUDA graphics. CATIA's Live Rendering feature, which uses Nvidia Iray, should also work with GeForce cards as well as Quados.

However, PTC's Creo Parametric offers a feature called Order Independent Transparency (OIT). This was originally only available with AMD FirePro cards, but now also includes Nvidia Quados. Either way, consumer-grade cards aren't supported. OIT makes transparent materials look more realistic, with correct depth effects and much better performance due to the hardware acceleration.

### FLEX THE MEMORY

Both AMD and Nvidia pointed out the availability of ECC memory on the top members of their ranges, which we mentioned elsewhere in

something called Multi-Frame Anti-Aliasing, which is aimed at games, and may not be available with professional software.

### MONITOR SUPPORT

The ability to drive large screen arrays or switch between multiple desktops are key features of both Nvidia and AMD professional ranges. AMD's Eyefinity multi-monitor system was actually introduced with its Radeon consumer range, however, Nvidia's nView desktop management system was dropped from the GeForce range when Windows Vista arrived, and became a Quadro-only feature. Using a synchronisation card and Gen-lock signal, multiple Quadro cards can also be combined into very large video arrays.

There is now also increasing interest in harnessing the GPU power for realistic live rendering and even accelerated final output

this article. Nvidia's Quados also support GPUDirect across compute nodes. The GeForce only supports this within a single computer. GPUDirect is primarily important for Tesla compute clusters connected via Infiniband, and allows GPU memory to be written to directly, without needing to write to system memory as an intermediary. Workstation users probably won't have an opportunity to take advantage of this facility. However, the Quadro cards support 64x FSAA antialiasing, and with multiple cards in SLI mode this can be increased to 128x. But Maxwell-generation GeForces offer

### FINAL THOUGHTS

There are lots of features that could justify the expense of a Quadro or FirePro over a GeForce or Radeon. However, if you want to investigate using the GPU for rendering, it may not be necessary to stick with pro cards. Although some systems like SolidWorks RealView explicitly won't work with consumer graphics, other systems like Nvidia Iray might. It's worth borrowing GeForce or Radeon hardware to try this out with your software, and some vendors, such as workstation manufacturer Boxx, have experimented with this and have had considerably positive results.





Nvidia and AMD claim over 100 apps have been certified using simulations and real-world scenarios for their professional cards

VAT, although this is about half the price of the M5000, and the M6000 is eye-wateringly close to £4,000, inc VAT.

Turning to AMD's FirePro range, the W8100 was (until the Quadro M4000 was launched) the best value professional graphics card with 8GB of frame buffer, and the W7100 offered this for even less, although its performance isn't so competitive. The W8100 boasts 2,560 stream processors, equivalent to the Radeon R9 390. AMD's top-end Radeon R9 Nano and Fury X both sport 4,096 stream processors, with the just-

Texture memory is far more important in pro cards than it is in consumer-grade ones, so they tend to have more of it...

released Fury X2 integrating two Fury GPUs on one board. There is actually no parallel to these in the FirePro range, with the top W9100 only offering 2,816 stream processors. However, this boasts a whopping 16GB of GDDR5 memory, more than any current card on the market, either consumer or professional. AMD

also has a new GPU generation called Polaris due in the first half of 2016, although as yet there has been no announcement when this will filter down to the professional range.

Summing this up, texture memory is far more important in professional cards than it is in consumer-grade ones. So they tend to have more of it, and this is an expensive inclusion which does go some way to explaining the price difference, particularly as this may also be Error-Correcting Code (ECC) memory. The Nvidia Quadro M5000 and M6000 use

**OIT – ORDER INDEPENDENT TRANSPARENCY**

**Less Visual Artifacts !**

Standard Blended transparency mode:

Visible artifacts and imprecise rendering

**GPU-accelerated OIT mode enabled!**

**Pixel Accurate rendering without visible artifacts!**

AMD FirePro W8100

AMD

8 | AMD FirePro™ / Creo 2.0 Launch Event | April 2012 | Confidential – NDA Required

Both pro AMD and pro Nvidia cards feature OIT, an expensive inclusion that accounts for the price difference





Consumer cards have come a long way to deliver high end standards



ECC memory, as do the AMD FirePro W8100 and W9100. But beyond this, manufacturers often talk about how driver optimisation will have a very tangible effect on performance and stability with professional 3D applications. This is perhaps the most contentious claim, so we thought we would put it to the test (see Performance Tests boxout). The results aren't a complete whitewash, but they are conclusive.

In the end, it's the performance results that really tell the story about why a professional card is your best choice for professional applications. Yes, you can achieve comparable or even better performance with a consumer-grade graphics card costing half the price in some applications. But some key software will be slower, and possibly catastrophically so. In a professional environment, you need to be certain that you can get the work done without any hitches, and you also need to know you can get technical support if things aren't working as they should. In our tests, the Nvidia Quadro M4000 provides reliable performance across the board, even if it's not always the fastest, whereas the GeForce GTX 970 is much more erratic. In other words, although you could save money by using a consumer-grade card, it could end up costing you more in the long run.

**FYI** Read our card reviews in issue 198, [www.bit.ly/3dworld-app](http://www.bit.ly/3dworld-app)

## PERFORMANCE TESTS

We put the professional and consumer cards through the mill, with some surprising results...

To test the vendors' theory that driver optimisation makes a considerable difference to the performance of professional graphics compared to consumer versions, we tried side-by-side tests of the Nvidia Quadro M4000 against a GeForce GTX 970, using SPECviewperf 12 and the OpenGL portion of Maxon Cinebench R15. The tests were performed with the cards installed in a YOYOTech Renatus Pro M3 workstation, equipped with an Intel Core i7-5830K six-core processor clocked to 4.2GHz and 32GB of 2,133MHz DDR4 SDRAM.

As we stated elsewhere in this article, both of these cards sport 1,664 CUDA cores, but the clock speeds are slightly different. The Quadro M4000 runs its GPU at

152.56 – a ten per cent lead. But half of the SPECviewperf 12 viewsets were significantly in favour of the M4000. In catia-04, the M4000 managed 86.03, compared to 69.77 for the GTX 970 – 23 per cent faster. Similarly, in creo-01, the M4000 achieved 73.72, where the GTX 970 could only manage 56.24 – 31 per cent faster. The gruelling energy-01 showed the benefits of driver optimisation and the extra memory, with the M4000 almost twice as fast as the GTX 970, gaining 5.85 versus 3.01.

However, of particular interest to 3D animators will be the score in the maya-04 viewset, where the M4000 achieved a healthy 68.77, but the GTX 970 was over 50 per cent faster still with 103.7. The GTX 970 was also 18 per cent faster than the M4000 in the clinical visualisation viewset, medical-01, with 29.88 versus 25.26. The most understandable win for the GTX 970 was in showcase-01, which is the first viewset to use DirectX acceleration. Since this is the API used by most games, rather than OpenGL, you would expect the consumer-oriented GTX 970 to be optimised for it. The GTX 970 managed 61.08, where the M4000 could only muster 43.7, making the non-professional card 40 per cent faster.

However, the remaining two tests illustrate where driver optimisation for specific types of software is important. The snx-02 viewset, which is based on the NX 8.0 CAD software from Siemens, completely flummoxed the GTX 970. The latter only managed 5.96, where the M4000 achieved 72.94, over 12 times faster, showing a complete lack of optimisation in the consumer card. The M4000 was also more than twice as fast in the SolidWorks-based sw-03, managing 101.3 compared to 50.1. So, for these applications, there are clear advantages to using professional hardware, with Siemens NX 8.0 being effectively unusable with consumer-grade graphics.

**FYI** Read the realtime rendering article here: [www.bit.ly/206-real-time](http://www.bit.ly/206-real-time)

It's the performance results that really tell the story about why a pro card is the best choice for pro apps

773MHz, whilst the Asus GeForce GTX 970 DirectCU II OC Strix we were comparing operates at a considerably faster 1,114MHz. However, the Quadro M4000 has 8GB of GDDR5 memory running at 6,000GHz, whilst the GeForce GTX 970 has only 4GB, running at 7,010MHz, although just 3.5GB operates at this speed, with the remaining 500MB is seven times slower. So, unless you need more than 3.5GB memory, the GTX 970 on paper has the upper hand, and looking at prices on YOYOTech.co.uk, it's much cheaper, too. The Quadro M4000 will set you back £779.90 inc VAT, whilst the GTX 970 is only £279.99 in VAT – and this is a premium model, too.

Taking all this into account, the performance results are very surprising. In Maxon Cinebench R15's OpenGL test, the GTX 970 beat the Quadro M4000 by 167.78 to





# Speed up your workflow with Position pass

In his third tutorial, *Josh Parks* shows how to generate and utilise the Position pass in V-Ray for Nuke



## AUTHOR PROFILE

### Josh Parks

Josh is a compositor at MPC as well as a part-time lecturer at the University of Hertfordshire.  
[www.joshparks.co.uk](http://www.joshparks.co.uk)

In last month's article I covered how to set up a custom light setup that would allow you to utilise passes that we can generate in V-Ray for Nuke in order to speed up your workflow. This issue I'm going to go over how to create and use the Position pass in order to generate custom mattes – speeding up our V-Ray for Nuke workflow.

Being able to create mattes that dynamically move with our object is a must on projects that have a quick turnaround. Using a Position pass we no longer have to fiddle around with roto when needing to mask areas on our CG renders.

When working on a project, the supervisor or director may want changes with regards to lighting, or the way in which a material reacts. You could go in and alter

your V-Ray for Nuke materials, but I want to make you aware of how you can use the information in your passes to give you a quicker turnaround speed.

There are two different types

Using Position pass we no longer have to fiddle around with roto when needing to mask areas on our CG renders

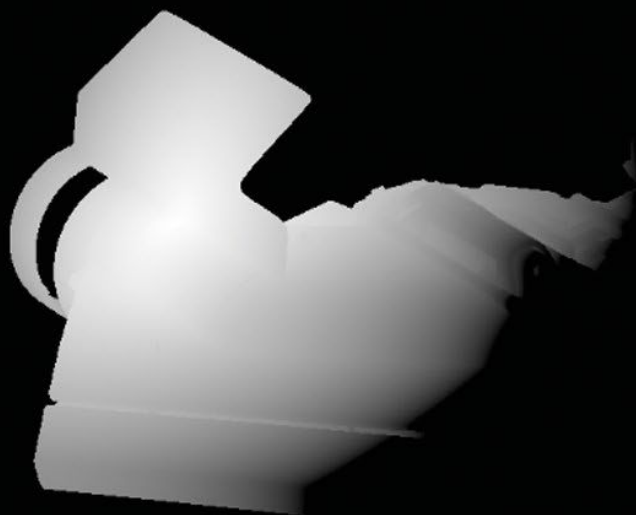
of Position pass that we can use. One is a World Position pass. This references world space and creates a matte only when the object moves through a certain space. This makes it useful when you need to create a fake light hit or wanting to up the saturation of your object in a certain

area of the world. To output this pass set the V-Ray Sample Info to PointCamera.

The second type of Position pass is Object Position. The values in this pass stay consistent to a specific part of the object, allowing us to create dynamic mattes that travel with our object – masking the same area, no matter where it moves in the scene. This is just called Point Object in the V-RaySampleInfo node.

Remember you don't have to use these mattes just to alter your beauty render, you can also use them to adjust specific sections of other passes. This gives you as an artist even more control over your final render.

**FYI** For all the assets you need go to [creativebloq.com/vault/3dw207](http://creativebloq.com/vault/3dw207)



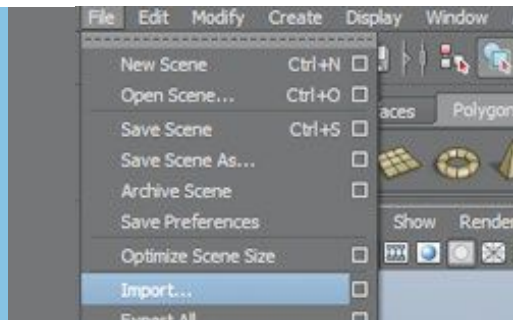
Creating and using the Position pass allows you to generate mattes and speed up your workflow



USING  
POSITION  
PASS

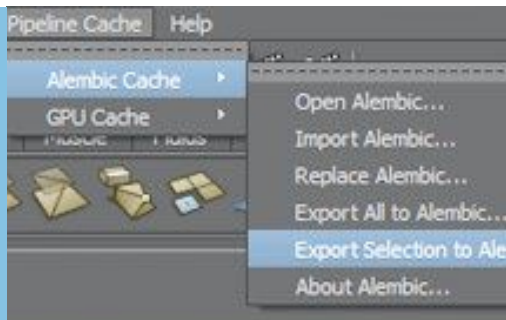
## PROCESS: SPEED UP YOUR WORKFLOW

Josh Parks shows how using Position pass in V-Ray for Nuke can improve your efficiency



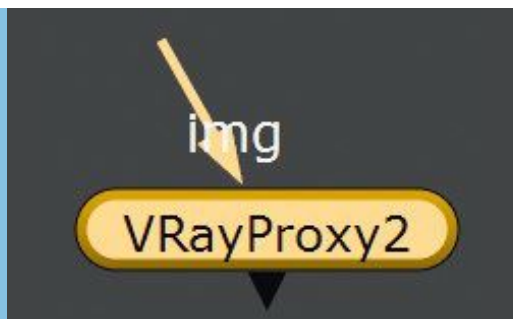
### ONE CONVERT YOUR GEO TO ALEMbic IN MAYA

In order for V-Ray to run as quickly as possible within Nuke you'll first want to export your geo out as an alembic file. By doing this before starting work properly you can make full use of the ProxyGeo node in Nuke. To do this, take your geo into Maya, by simply going to File>Import and then importing your .obj file.



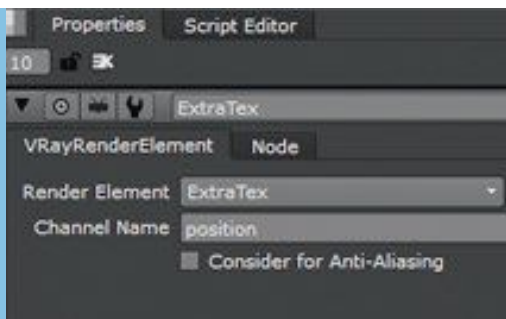
### TWO ALEMbic CACHE

Once you've got your file in Maya, it's time to export your geo as an Alembic file. So go to Pipeline Cache in the top menu bar in Maya and then click Alembic Cache and then finally ExportAll – you're done. Remember, if you want to change materials in V-Ray for Nuke then ensure you give groups of geo appropriate names.



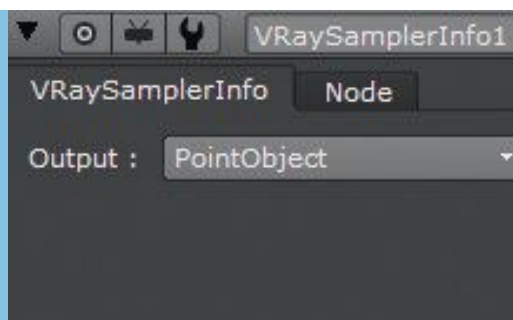
### THREE READ YOUR GEO

To make the most of your alembic geo file you need to bring the geo in with a VRayProxy node, so the scene runs as quickly as possible. Click Tab and type VRayProxy. Once brought in open up Properties and click the Folder icon, and select your .abc file. To check everything is OK, when viewing your VRayProxy node click Tab with your cursor in the viewer. You should now see your geo in 3D space.



### FOUR GENERATE YOUR POSITION PASS

Now we're going to set up our pass outputs as well as outputting General Diffuse/Spec passes, and we're going to set up Data passes. In order to do this you need to use a VRayRenderElement node set to ExtraTex. To set this up click Tab, type VRayRenderElement and then click Enter. Now in Properties set the Render Element to ExtraTex and type Position in Channel Name.



### FIVE USE V-RAY SAMPLER NODE

With your VRayRenderElement node set to ExtraTex you can now plug in a VRaySamplerInfo node to set the extra pass you want to output. So click the VRaySamplerInfo tab and then click Enter, which will bring up the properties of this node. Set Output to PointObject or PointCamera, depending on what information you want to output.



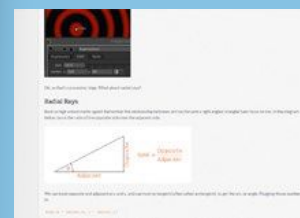
### SIX BRING IN THE P\_MASK NODE

The node you use to create your mask is called P\_Mask node, which can be found on Nukepedia to freely download and use. There is also a YouTube video ([www.bit.ly/207-vrayfornuke](http://www.bit.ly/207-vrayfornuke)) that covers how to install gizmos like this, so I won't cover this here, but the code can be found by searching P\_mask on the Nukepedia website.

## P\_MASK NODE

The maths behind the node

If like me you like to understand everything that is happening in Nuke, you can find the maths behind the P\_Mask node here: [www.nukepedia.com/written-tutorials/expressions-101](http://www.nukepedia.com/written-tutorials/expressions-101)



The node you use to  
create your mask is  
called P\_Mask node...  
found on Nukepedia



It's incredibly easy to  
create a script that  
isn't optimised, which in  
turn will slow you down

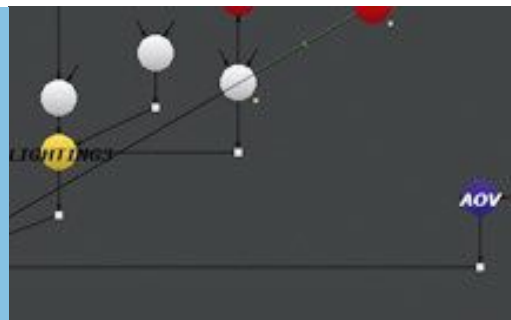
## FURTHER TRAINING

Install Nuke Gizmos

You can learn how to install and customise scripts and Gizmo files with this easy-to-follow YouTube video, which can be viewed at [www.bit.ly/207-nuke](http://www.bit.ly/207-nuke)

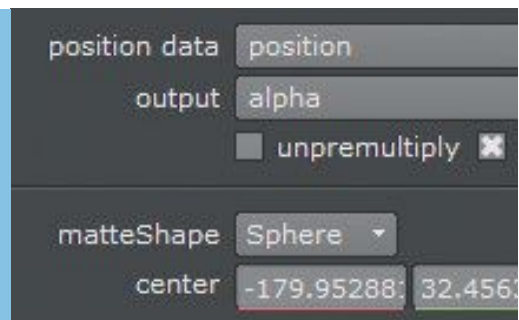


The Max operation will keep the maximum values of both your A and B input



### SEVEN KEEP YOUR SCRIPT NEAT

As covered previously, in order to keep your Nuke script as neat as possible, it's a good idea to make a Scene node for each group of inputs. For example, one for lights, one for geometry and one to attach all your VRayRenderElements to. If you don't do this it's incredibly easy to create a script that isn't optimised, which in turn will slow you down.



### EIGHT SAMPLE THE POSITION COLOUR

With your P\_Matte nodes properties open, make sure that your Position Data is set to your Position pass, otherwise you'll be sampling the wrong values. Your Output should be set to Alpha. In order to collect the sample information that is displayed as a colour, we first need to click the colour box on the P\_Mask Properties panel then [Ctrl]+[Alt]-click our pass in order to sample the values.



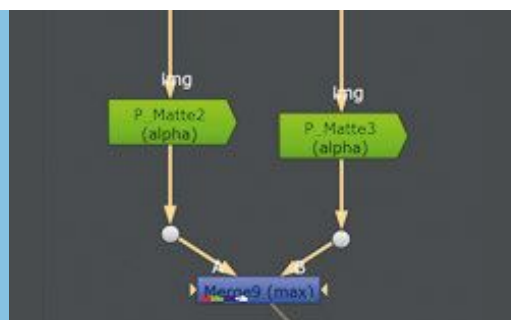
### NINE ADJUST YOUR MASK

You can view the mask created by placing the cursor over the viewer window and pressing [A]. If you want to change the shape and size of your mask you can use the Scale slider, as well as upping the values in the individual Scale Axis panels. You can also change the falloff type in order to give a different gradient to your matte.



### TEN GIVE YOURSELF MORE CONTROL

You could also render out ID\_Mattes, then you're able to do a number of things with both them and the alpha generated from the P\_Mask node. With all this information you should be able to adjust your masks, in order to give you the exact area of interest that you want.



### ELEVEN COMBINE P\_WORLD MASK MATTES

Often I find that in order to get more control I have to combine the mattes generated from the Position Pass. To do this I use the Max operation in a Merge node. You can simply create another P\_Mask node and sample a different area of your Position pass. You could even combine results from both Object Position and World Position passes.



### TWELVE ADJUST INDIVIDUAL PASSES

Instead of using these masks to just change your beauty pass you can have more control by using them on individual passes. You can find on the internet how to create a Beauty pass out of your individual passes. This is what big facilities do in order to give compositors as much control as possible.



ISSUE 208

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SOFTWARE REVIEW

# Slik 2 for Modo

PRICE £99 / €139 / \$149 | COMPANY The Foundry | WEBSITE [www.thefoundry.co.uk](http://www.thefoundry.co.uk)



## AUTHOR PROFILE

**Mike Griggs**

Polishing pixels since 1995, Mike is a UK-based freelance 3D, VFX and mograph artist, and a freelance technical writer. [creativebloke.com](http://creativebloke.com)

Learning about how to light CG scenes is one of the key skills of learning 3D, with Slik 2 for Modo, The Foundry has offered a practical solution for every level of CG artist.

Lighting is one of those disciplines that is simple to learn but requires patience and research to master. The mistake many new CG artist's make is to light as they see other 3D artist's do, when in fact the best source is to look at how photographers and cinematographer's light their scene. Slik (The Studio Lighting & Illuminance Kit) for Modo was an excellent solution; the plug-in added true lighting setups to a scene, with realistic modelled objects like softboxes and reflectors with embedded Modo lights. This enabled the artist to set up a scene like a photographer.

However, the scene could get heavy with the extra geometry. With the release of Slik 2 for Modo (while you can use the

With Slik 2 for Modo, The Foundry has offered a practical solution for every level of CG artist

old workflow, which benefits from the speed improvements of Modo 902), there are now a lot more options which lift Slik 2 into full production solution. Chief among those is the new Slik reflector object, which, like all the lights in Slik 2, can be targeted in any camera viewport window including Modo's preview by pressing the [9] key. The Slik reflector object is a lot less heavy in terms of geometry and has features like gradients and interactive falloffs enabling the creation of a truly bespoke lighting system. It is still good practise to use the supplied meshes, especially the

platforms which provide a good base for product lighting shots.

The UI has been improved, with the excellent Lighting Board giving you full access to all your Slik Lights. The Lighting Board allows full power and colour control of each light, with the ability to mute or solo them; it's a sophisticated way of identifying which light is doing what.

When your ready to render, Slik can create mattes and lighting passes, which, when rendered, can be imported and controlled in Photoshop and After Effects with the included scripts. Slik 2 also makes it easy to create HDR images of any Slik setup. These can be swapped out for the Slik geometry to simplify the scene (and help with render times) and can be used in any 3D application, adding to Modo's excellent abilities as a true modelling and look-development tool for any 3D artist.

## VERDICT



## MAIN FEATURES

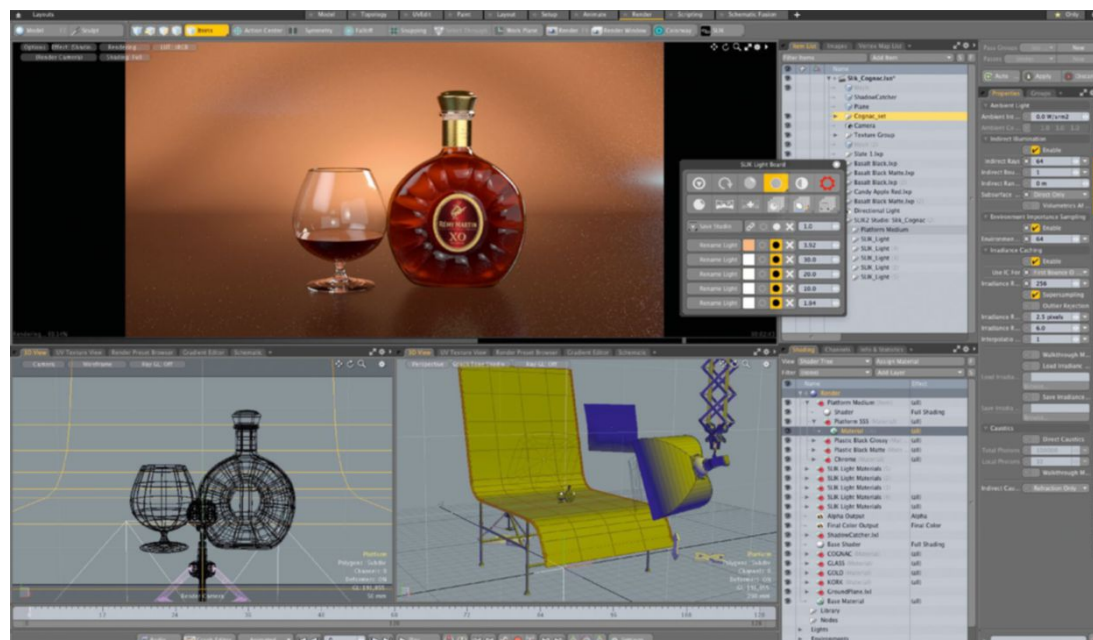
Interactive light placement in Modo

Lighting Board

HDR-creation environment

Real lighting objects: Reflectors and Pantographs

Scripts for Modo and After Effects



Slik 2 for Modo offers a complete light setup and HDR-creation environment for new or experienced Modo artists



## CG LIGHTING FOR PHOTOGRAPHERS

Slik is the brainchild of Yazan Malkosh, who wanted a way of introducing anyone, but specifically photographers to explore lighting in Modo, using Modo's robust assembly structure to create a truly 'analogue' lighting environment creator. Yazan is working to bring even deeper integration between Slik and Modo.

# Trapcode Suite 13

PRICE \$999 | COMPANY Red Giant | WEBSITE [www.redgiant.com](http://www.redgiant.com)

Red Giant's Trapcode Suite has a large and well deserved following, with fans praising the fully loaded toolset. With that in mind it's hard to see where it could improve, but the latest version, the thirteenth release, has definitely brought more to the table.

Firstly there is a brand-new tool in the suite: Trapcode Tao. It's a 3D motion graphics tool that brings a simple concept to life. Aimed at creating organic motion to a project defined by other elements, Tao is simple and fun to use and can return great results in little time. Any After Effects user should be able to master it in a morning, as it is deeply integrated and feels familiar immediately. In use it's fast, slick and responsive, with almost instant feedback. If you need flourishes, ribbons or even ambient background animation, it's a nifty addition.

Each tool in the suite has something new to offer, but some have received less attention than

Trapcode Tao is a 3D motion graphics tool that brings a simple concept to life

others. Shine, Soundkeys, Starglow and Form have slightly boosted abilities, however, it's obvious that Particular has had the most development work and that's probably appropriate, as it's the most commonly used tool and the one that needed some updating.

The first time you start up Particular you might miss the biggest new feature, as the effects control palette looks very much like it always has, which will come as a relief to those who are comfortable with their methods. However, press the Effects Builder button and you may decide never to go back to your old methods. What you are presented with is a

current particle settings live with a moveable emitter, so you can previz emitter animations, or different camera angles. The rest of this new interface is given over to specifics. Tabbed areas let you quickly switch from emitter settings to particle styles; including 3D particles. The GUI is well designed and finding your way round is a breeze. If you are a Magic Bullet user, you'll recognise some of the other interface quirks, like the slide-in libraries, accessed by arrow buttons in the upper corners. This may all sound like a lot of clicking to get to a given area, but in use it's very fast, with each area well defined and logical. Moving from one type of emitter and then drilling into the colour or physics settings is really very easy.

Maybe check your GPU with the Effects Builder, as it does need a bit of power to remain smooth with some setups, but rest assured that this is a solid update and Particular remains at the top of the class.

VERDICT



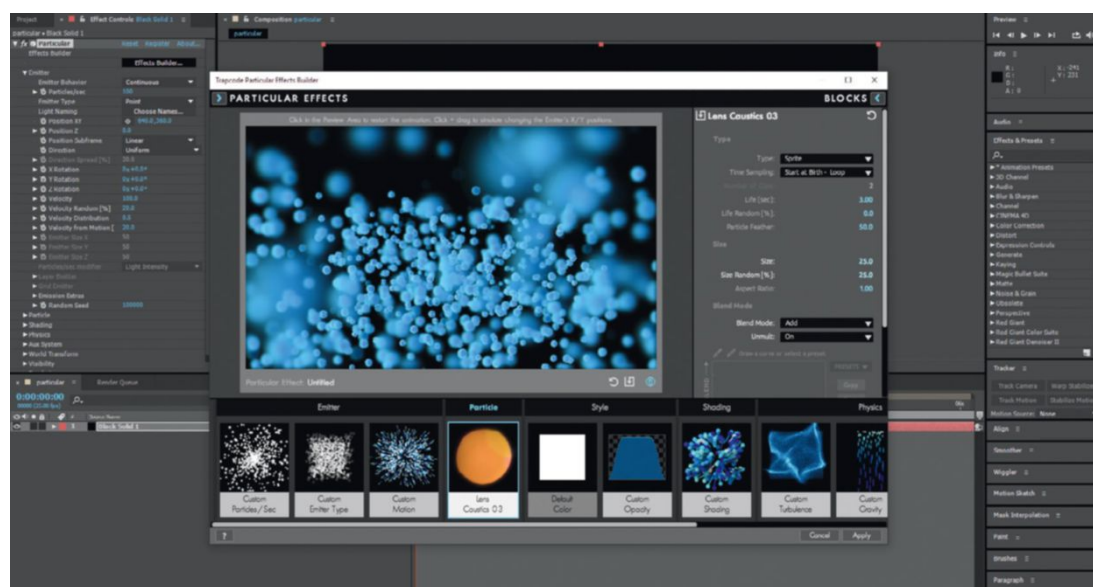
## AUTHOR PROFILE

**Rob Redman**

Rob is creative director at a boutique animation and VFX studio, working across TV, film and print. Often found on the events circuit, he is a regular speaker at industry conferences. [pariahstudios.co.uk](http://pariahstudios.co.uk)



Although Tao is a new addition to the suite, the Effects Builder could be considered the star of the show in this release



## POWER TO THE PLUG-INS

After Effects may be a complete solution, but I don't know of a single pro user who doesn't use a plug-in for a significant portion of their work and the Trapcode Suite is often considered a must-have when planning upgrades and studio budgets, due to its ease and range of powerful tools.

## MAIN FEATURES

Particular's Effects Builder

Massive new presets library

Tao, new motion graphics tool

MIR 2.0



# Filter Forge 5

PRICE Basic Edition \$149, Standard Edition, \$249, Professional Edition \$399 | COMPANY Filter Forge Inc | WEBSITE [www.filterforge.com](http://www.filterforge.com)



## AUTHOR PROFILE

**Cirstyn Bech-Yagher**

Cirstyn is a freelance CG artist and educator, with over 15 years' experience in 3D. Her clients have ranged from AMD to Daz 3D and Future Plc. She is currently providing design and tutorial content to HobbyRender.com's launch in February. [nothern-studios.com](http://nothern-studios.com)

Despite Filter Forge 5's new features seeming solid, well tested and developed, they seem like enhancements rather than major new functionality. However, if you've been collecting frequent flyer miles in the Node editor's Bomber, Brick, Tile and Pavement components, there's good news: they've all received major overhauls, as well as new features to support them.

First introduced in Filter Forge 2, the Bomber component has become one of Filter Forge's most popular features, as it has enabled people to create anything from game-textures to bokeh. It's a super-controllable component particle sprayer that layers fractally – each layer being 2x smaller than the layer under it – and it can output in HDR, colour tints and provides controllable chaos.

## Solving output issues

The new Bomber Plus component adds to this by lifting the set amount of particles from five slaves to 10, thereby opening for an infinite amount of particle types. It has also bulked up other functions, like individual particle customisation, nesting and slave component enhancements. Specifically created as a supporting

feature to the Bomber Plus component, you can use the new Map Switch in whichever context you want, thereby solving a long standing output issue. If you're familiar with Filter Forge's node colours, you know slave outputs are a map, and hence, green. You'll also know the Selector input of the existing Switch component is grey, and hence incompatible with the slave's output. The new

Filter Forge earns its place as a vital toolbox staple by making sure its strength is where it's always been

Map Switch node fixes this for the Bomber Plus and other functions by simply letting the new Map Switch accept connections from map components. The Brick, Tile and Pavement components have gotten some much needed TLC as well, with new Plus components sporting features and functionality.

Another beneficiary of the new Bomber Plus addition is the new Pixel Awareness node, which finally lets Filter Forge

generate output dependent on exact pixel coordinates.

## Workflow, not output

So how does it compare to the competition, like the Quixel and Substance suites? Very well. Filter Forge earns its place as a vital toolbox staple by making sure its strength is where it's always been: ease and speed of generating any tiling textures ranging from cloth to nebulae.

However, it may be getting a little long in the workflow tooth from a texturing point of view. It's still build texture, generate all maps one by one, save to file(s), refresh in renderer, rinse, repeat, as it generates 3D textures in tiles or (Photoshop) selections only. Substance and Quixel let you generate texture and detail (maps) directly onto your mesh, which significantly speeds up your workflow.

But is it worth picking up? Yes. You can easily tweak and import any of the 5K texture/filters in their library into the suites, and its flexibility and ease of use ensures it will be a toolbox staple for quite a while yet.

## VERDICT



## MAIN FEATURES

Bomber Plus: enhanced extra texture-bomber component

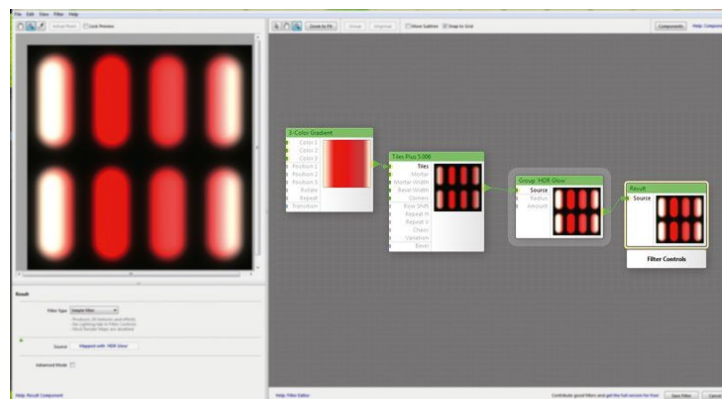
Patterns Plus: enhanced extra Bricks, Tiles and Pavement components

Map Switch

Pixel Awareness

Modulo component

Filter Forge supports HDR colours on both inputs and outputs, together with Tiles Plus you can generate lightprobes to render – they work nicely with varied whitebalance outputs



## A TEXTURING TOOLKIT STAPLE

First released in 2007, Filter Forge has become a staple in many a 3D toolkit, because of its ease, speed and versatility. Its output can be seen ranging from games like Mass Effect to content brokerage products. It's one of the most used and solid staples across the texturing board.

# Yoyotech Renatus Pro M3

**PRICE** £2,727.14 inc VAT | **COMPANY** Yoyotech | **WEBSITE** [www.yoyotech.co.uk](http://www.yoyotech.co.uk)

The Yoyotech Renatus Pro M3 combines some enterprise-grade components with very capable 3D modelling and rendering performance

**Y**oyotech is a somewhat unfamiliar name in the workstation market, although the company has been supplying a professional range for a few years now. The Renatus Pro M3, however, is a brand new line. It combines a familiar set of components with one or two enhancements that could win it favour in the larger corporate world.

The first familiar component is an Intel Core i7 processor, which has become increasingly popular in

It's extremely well put together, with enterprise-grade power supply monitoring and secondary storage



## MAIN FEATURES

3.5GHz Intel Core i7-5930K at 4.2GHz

32GB 2,133MHz DDR4 SDRAM

Nvidia Quadro M4000 with 8GB GDDR5 memory

256GB Samsung SM951 PCI Express M.2 solid state disk  
1TB Seagate Constellation ES.3 SATA 7,200rpm hard disk  
DVD rewriter

Warranty: 30 days collect and return, 3 Years RTB, 1st parts and labour, 2nd and 3rd parts only

workstations. The six-core 5930K is a good balance of clock frequency and multi-core power, and Yoyotech has set it permanently to 4.2GHz, with NZXT Kraken X61 water cooling to keep temperatures at bay. The increased frequency over the stock 3.5GHz is covered by the three-year return-to-base warranty, with the first year parts and labour, and the other two labour only, although 30 days of collect-and-return have been thrown in at the beginning.

The processor has been partnered with a healthy 32GB of 2,133MHz DDR4 memory, although Yoyotech has strangely supplied this as eight DIMMs, so there are no slots free for upgrade left on the motherboard. Graphics takes the shape of the now-familiar Nvidia Quadro M4000. This high-end card sports a hefty 1,664 CUDA cores and an equally impressive 8GB of GDDR5 memory, making it great for handling large texture sets, and with plenty of GPU grunt available.

Storage takes the usual form of a solid state disk for operating system and main applications, plus a conventional hard disk for general data. The SSD in question is a Samsung SM951 NVMe unit, attached using the M.2 PCI Express slot. This is hugely quick, even compared to a SATA-connected SSD, and will storm through system

booting and software loading, although its capacity is merely adequate. Similarly adequate is the 1TB 7,200rpm hard disk, although this is from Seagate's Constellation ES.3 range, so is rated for years of all-day operation without failure, which will be reassuring for a professional.

Another reassuring inclusion for the professional is the 750W Thermaltake SMART DPS G Gold PSU, which is connected to a USB port so the power supplied to each voltage rail can be monitored and recorded – both locally on the system itself and across the network. This allows you, or your IT manager, to keep a very close watch on which components are making the biggest dent in your electricity bill.

The Renatus Pro M3's six-core processor gives a good showing with Maxon Cinebench R15's render

test, achieving 1,221. More cores is best here, and we've seen dual-socket systems go way beyond this level, but the score is good for a single socket. The Cinebench R15 OpenGL result of 166.2 is decent, and there are some very credible scores in SPECviewperf 12 too. The maya-04 result of 68.38 is very good, and 116.78 in sw-03 is excellent, but overall the system performs as we would expect from a workstation equipped with Nvidia Quadro M4000 graphics.

Costing £2,727.14 inc VAT, the Yoyotech Renatus Pro M3 is a little on the pricey side. But it's extremely well put together, with enterprise-grade power supply monitoring and secondary storage. It also offers dependable performance both for rendering and modelling, although the latter will be its particular forte.

**VERDICT**



## AUTHOR PROFILE

**James Morris**

James has been writing about technology for two decades, focusing on content creation hardware and software. He was editor of PC Pro magazine for five years.

[www.tzero.co.uk](http://www.tzero.co.uk)

## CENTERPRISING YOYOTECH

The Yoyotech brand has been well known for its customised PCs and gaming performance products for many years, but was acquired by Centerprise International in 2013. Centerprise has been going for more than three decades, and the acquisition has refocused Yoyotech more on the professional end of the market, including 3D content creation, audio and video production.



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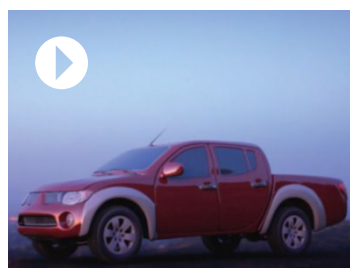
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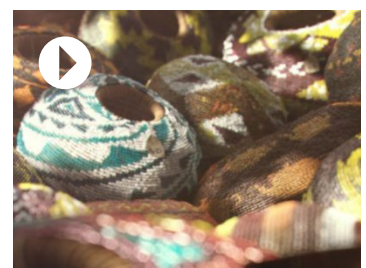
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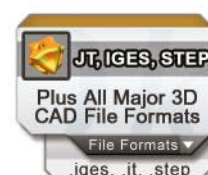
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